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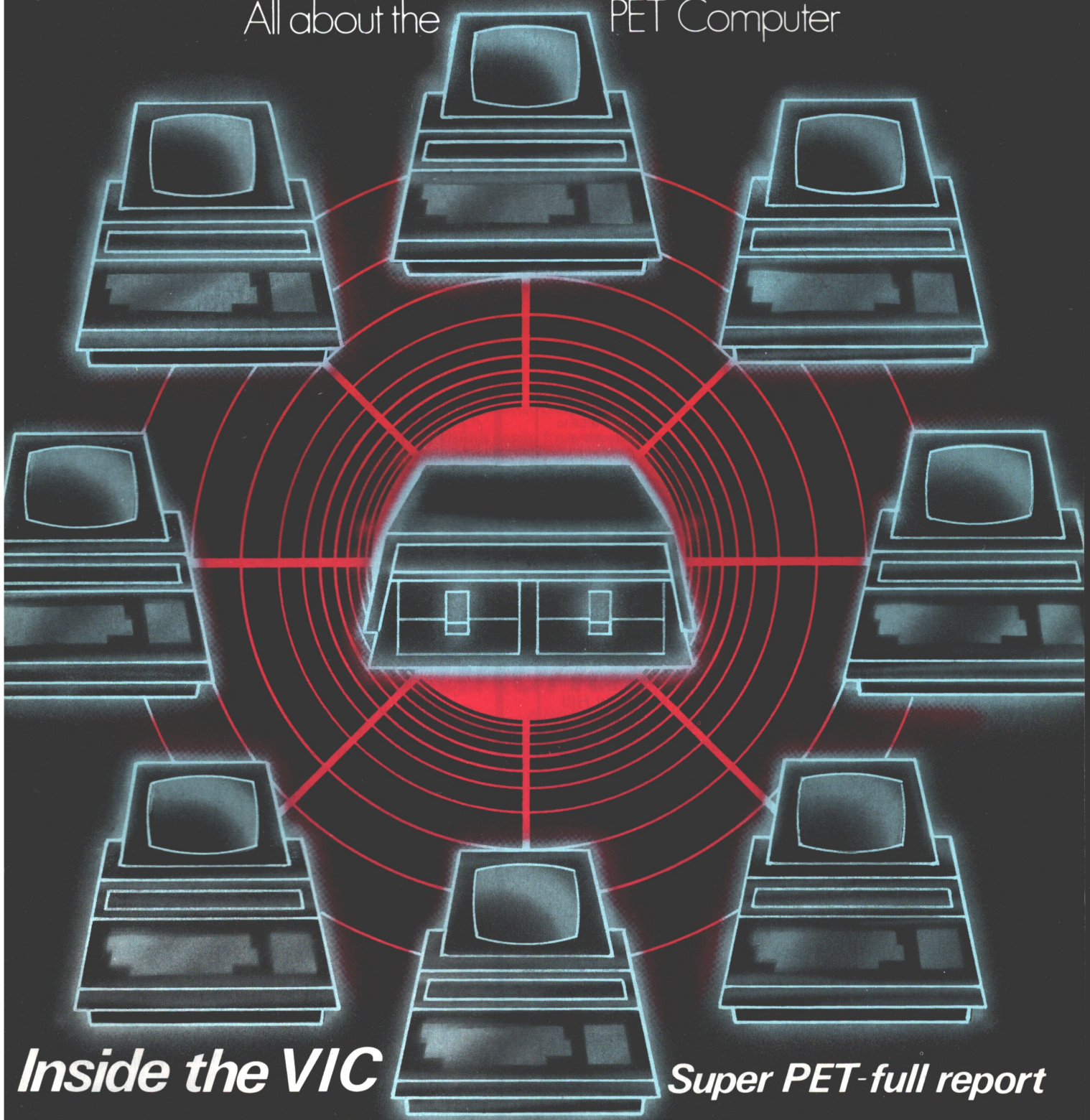
GREAT COMPUTER QUIZ

All about the PET Computer



Inside the VIC

Super PET - full report

How to buy a computer

All about MULTI USER SYSTEMS

BUSINESS SOFTWARE GUIDE

plus latest PET News, Program reviews + gossip

Vol. 2, Number 3 April 1981

95p

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(WE MANUFACTURE THEM)

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Editorial

Here in PRINTOUT's editorial offices, we feel a moment of truth rapidly bearing down on us. The speed of its approach is almost too quick for comfort, but it is nevertheless inducing a certain frisson *of pleasurable anticipation too.*

And what, you may well ask, is *this moment of truth, and what's the background to it?*

Quite simply, it's growing evidence that Commodore's new baby "VIC" is going to be a very considerable force with which to reckon.

If you're a regular PRINTOUT reader, you'll have seen the material we have published on VIC (with another piece in this issue also) and doubtless you will have concluded that, though VIC may not be a serious business computer, a toy it certainly is not either.

We have even more data to add to that now. For instance, how about an indication from a reliable source that Commodore are planning to sell 100,000 – yes, one hundred thousand *VIC units here in the U.K. during the next year.*

If they do *all sell, and there's absolutely no reason to suppose they won't, that'll be more than the combined sales of every single microcomputer sold thus far, of whatever size or brand.*

As we said, VIC is clearly a force with which to reckon.

Thus our imminent moment of truth; should we continue to concentrate on the PET alone or should we widen the net slightly to encompass VIC also?

Frankly, our inclination is towards the latter, and this is based on the fact that VIC is expected to have considerable compatibility with existing software, of the cassette-based kind. It's BASIC 2 will be largely similar to that of today's PET.

We shall have to wait and see, aided by the continued coverage we plan to give VIC until it becomes a tangible reality – a moment which is not too far away now.

The most important item we will have run on VIC so far is currently planned for our next issue – a genuinely in-depth evaluation of VIC in its presently known entirety, conducted by Ramon Zamorra exclusively for us.

Ramon is, of course, an authority on matters connected with Commodore and its products and we suspect you'll find his microscopic scrutiny of VIC in our next issue to be of the deepest interest.

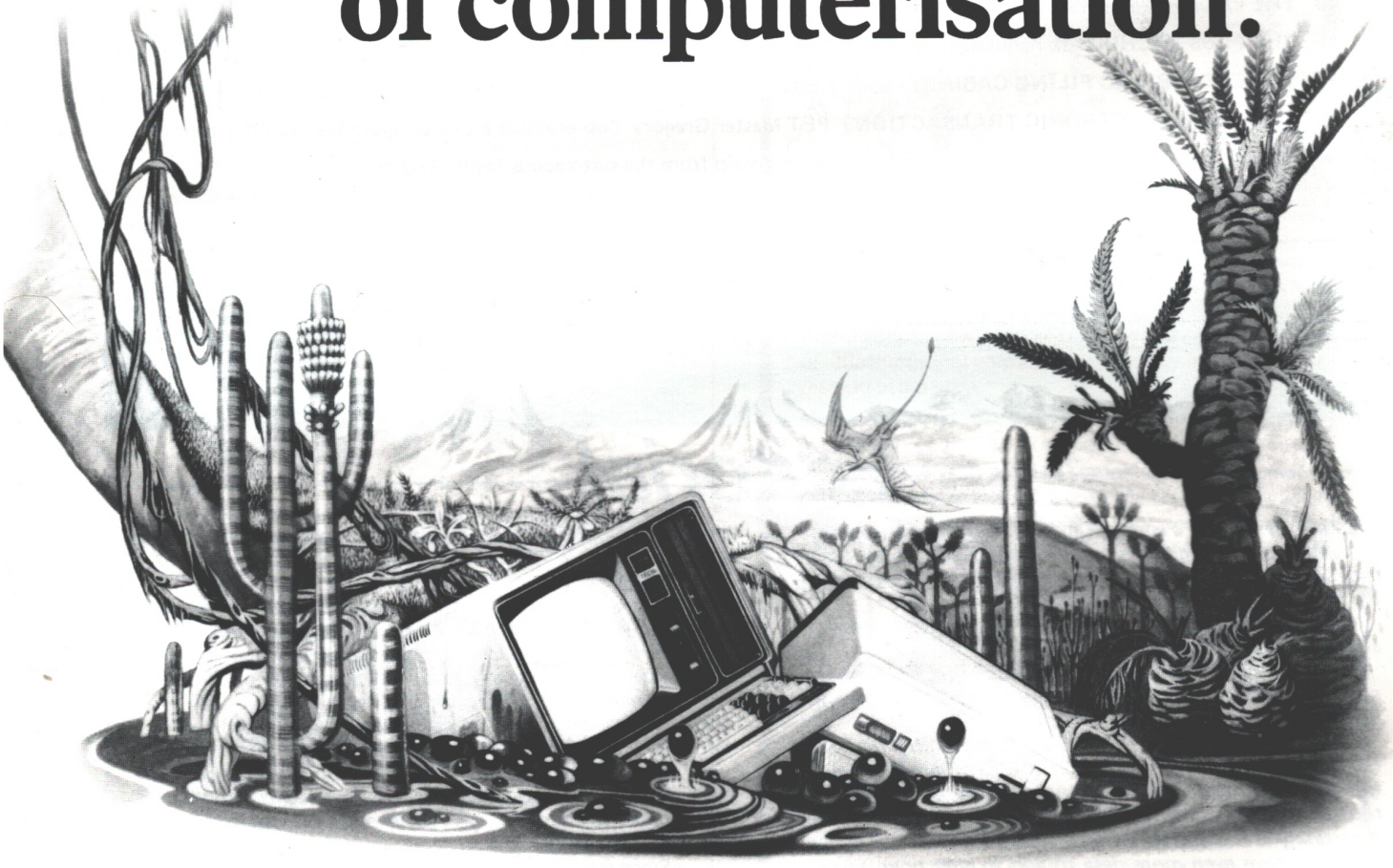
Since every indication so far suggests that Commodore are not going to be caught by the mistakes they originally made with PET's launch some years ago, it is not surprising that whispers are rippling up and down wholesale and retail outlets, and through High Streets everywhere.

Though VIC will almost certainly be a personal/home computer primarily, that doesn't lessen its impact. Rather it strengthens it, for all of us know that the great computer revolution is well under way. It merely needs something of VIC's size, shape, possibilities and price to provide the escape velocity for orbit.

And one thing's for sure therefore – PRINTOUT cannot and will not ignore it altogether.

T.H.

The Commodore PET offers you a safe passage through the primeval swamp of computerisation.



The miracle of microchip technology has made the main-frame computer seem like a dinosaur. But how many microcomputers will go the same way?

Without good software and support a micro-computer is less capable than your office calculator. So as competition grows amongst manufacturers in this industry, only those with the finest software and the best supporting facilities will survive.

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Another unique way in which Commodore helps you get the most out of your microcomputer is by publishing the regular PET Users' Newsletter. For an annual subscription of only £10 you can keep up-to-date with developments and share new ideas and applications with over 3,000 PET users.

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Look out for this sign.

You'll find it on such famous programs as WORDPRO and WORDCRAFT, which turn your PET into a first-class wordprocessor; as well as on hardware like the MUPET system, which allows a number of PETs to be run with a single, letter-quality printer.

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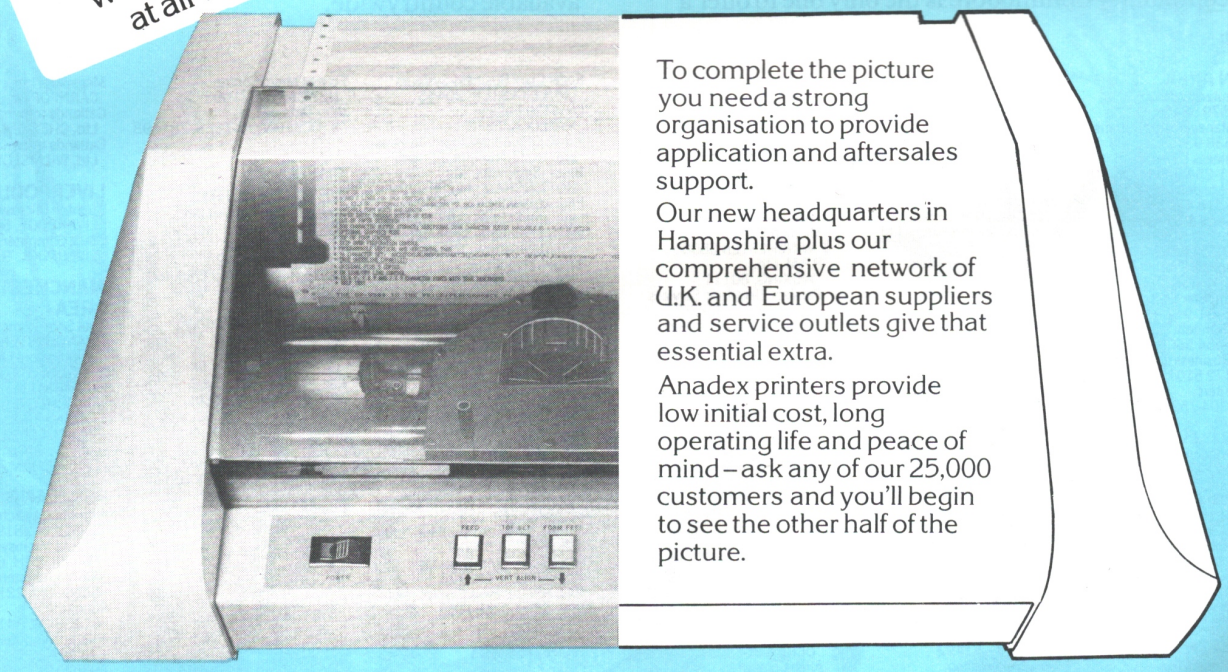

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Conclusions

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READ/WRITE

Your letters, our replies: are we all being overcharged, and other topics

Daylight Robbery I

May I be allowed a little more space to reply to your reply to my letter in the January issue. The comment appeared at one stage: "...so it is certainly not the dealer who is profiteering." This is my point exactly: that some other link in the chain, either the importer or manufacturer are charging what they think the market will bear. Let me illustrate the point — the disks I bought from the States were not "El Cheapo" but 3M in sealed boxes. I have seen a 3M Trade price list over here and the price is nearly double. Even with VAT and import duty, I am paying less than a dealer gets them. Perhaps the philosophy is best summed up by a short article which appeared in the December issue of Practical Computing: "At the same time (1979), the retail prices of personal micros were falling. When they were first launched, the Apple, PET, and TRS-80 were almost twice the U.S. price, the result of decisions by the U.K. distributors that this was the way to optimise profits. Towards the end of 1979 however, competition forced a price war...."

It is a fallacy to suggest that you won't get support from U.S. firms; in a lot of cases I have had prompt and superlative service from that country and in most cases they are a lot faster than their U.K. counterparts. And in a lot of cases software gets by without any VAT or duty charges which makes it even more attractive.

John C. Nuttall,
Manor Close,
Henfield,
West Sussex

'Support' and 'Prompt Service' are desirable but different, at least to our way of thinking. Whilst there are packages that can be loaded and run without support, we think that purchasers of the more sophisticated software would be unwise to dispense with the support a local supplier can provide. Even assuming that such guidance can satisfactorily be given over the telephone, the cost of a transatlantic call could well negate any price advantage.

Daylight Robbery II

I must challenge your defence of the inflated prices charged by some UK distributors of PET goodies imported from the USA (your comment on John Nuttall's letter in January PRINTOUT).

For a start, it must be wrong to include VAT in the importer's costs since this will be off set against the VAT he recovers from the end user, on top of the quoted selling price. That knocks down your 'cost of importing' from 50% to 35%. Even 35%, in my experience, is an improbably high charge for small items whose airfreight (or even airmail, which I normally use) cost is relatively low.

I bought my copy of PET VisiCalc recently (after the increase) for $168, at which it is widely advertised, plus $8 for airmail and nothing at all for duty or VAT. At $2.40 to £1 that come to £73.33 against a UK price of £143.75 (£125 + 15%). I wonder if VAT ought to be charged on this product? Certainly books are zero-rated and the excellent VisiCalc manual is arguably the predominant part of the package. My impression from Customs officials is that only the media are subject to tax and duty.

Cursor cost me $48 (just over £20 by Access/Mastercharge) for 12 issues sent direct by airmail as soon as they are published; No.23, with ORRERY etc., arrived before Xmas. That is just half the UK price!

For diskette quality, my preference currently lies with the US suppliers. The only bad disks I have experienced so far were unbranded ones at £30 for 10, all I could get from my UK supplier a year ago. I now use Scotch (3M) brand at $31.50 (£13.13) in USA shops: other well-known brands are down to $24 for 10.

The true explanation for the higher prices charged in Britain has little to do with the cost of the product and a lot to do with what the market will bear and the level of competition. It also reflects the volume of business done, which is often rather low in the UK.

Like you, I believe in supporting home dealers and for most computer purchases I do. But sometimes I cannot wait for a product to come on the market here and sometimes the price surcharge is just too much to swallow!

Vive le competition!

Peter Reynolds,
Claremont Road,
Tunbridge Wells, Kent

The formula we used to establish a 'fair' premium on imports did include customs duty but not VAT. The other components were airfreight, insurance, customs agency charges for clearance, finance, forward currency margin, plus modest figures for promotion, advertising and profit. A merchant bank has confirmed the accuracy of our formula for the sort of volumes we are talking about.

We do share your view that software should not be subject to VAT. The Customs, whose powers these days seem limitless, do not agree, unfortunately. Customs & Excise were reluctant to give any concise official comment in time for publication. However, we understand that duty is normally calculated from the usual selling price in the country of origin, but that VAT is calculated on that price plus the cost of shipping. Duty is payable on software imported by post. HM Customs recently doubled the VAT rate on the Toolkit with retrospective effect, so the unfortunate importers were forced to pay up several thousand pounds without any means of recovering it.

It is certainly possible to obtain discounts on software although you should not then expect much in the way of support from the supplier.

Pete's Penance and Lindsay's Largesse

Commodore has recently announced cancellation of 20 cassette titles from their list, which means that over 50% of all the catalogue numbers assigned up to that time have been withdrawn. This is described as "...a number of changes to the existing catalogue, designed to improve the overall quality of the programs available..." Words of one syllable! CPUCN, the house organ to which one must subscribe to get the latest releases, goes on to say, "A lot of old titles have disappeared, to be replaced by an excellent set of new ones...", but in fact none of the 13 new programs they then proceed to list are *replacements* for any of the cancelled programs.

And the catalogue! I suppose it would be picky of me to point out that they can't seem to make up their minds about the prices. A program called LIBRARY OF SUB-ROUTINES is twice listed in the catalogue at £7.00 and once at £10.00. We are not told what the prices will get us, except that it is a "vast array of programs".

Commodore UK is apparently unable to generate printed matter free of factual and spelling ("malevolant" Invaders) and typographical errors ("comany" order No., "2-Sroke" Engine, etc.) Why do we in England accept low levels of quality which would be rejected in any other advanced country in the world? On the day that Commodore puts out an error-free release, I will stand the bill at my nearest pub to all comers from 9:00 to 5:00. I hope that 1981 will see the day!

Lindsay Doyle,
Lowndes Square,
London

Commodore's Pete Gerrard was slaving over a set of hot proofs when we telephoned. Too many subroutines to list them all, he said; (over sixty at the last count). He would flagelate himself (!) for using the word "replace" in CPUCN, but was so confident of the textual accuracy of his new catalogue that he would be camping out at Lindsay's local. Subject to Pete being right about this (and we aren't exactly counting on it ourselves), readers may like to note that Lindsay's local is — appropriately — The Australian, 29 Milner Street, Chelsea, London S.W.3.

▷ 11

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MICRO-30

This Business Package, which has most of the MICRO-80 facilities, is designed for the 3000 series machines.

** Again only three disks are used for the Sales, Nominal and Purchase Ledgers.

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** Upgrade capability to MICRO-80 or to the new operating system.

BUSINESS SOFTWARE

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Ref: PO/01

READ/WRITE

The Cost of Cursor

The current cost of Cursor in the U.S.A. is six issues for $33 (£14.35) but Ron Jeffries of The Code Works tells me that there has been an increase in air freight and this will add around $5, making six issues for £16.95, which makes the U.K. price less than 25% up on the U.S.A. price, 15% of which is VAT.

As to import duty and VAT rates, I am inclined to agree with Mr. Reynolds. However, the Customs Officer does not, so please direct these complaints directly to the appropriate Government Department.

Mr. Reynolds should also note that these products have to be marketed through advertising in the U.K. where most micro users do not read the American magazines. This alone is expensive, but when you consider the overheads of even the most efficient companies, and that the American companies typically give 30% discount, and as distributors you would have to give at least 25% to your own dealers, it would seem to me that 50% including VAT increase in cost is not so much justified as necessary to stay in business.

Martin Maynard,
Audiogenic Ltd.,
P.O. Box 88, Reading

Finding Freelance Programmers

In the last issue of *PRINTOUT*, Hotline remarks under the heading "Made to Measure" on the difficulty of getting custom-made programs, since there are so many packages.

As a free-lance programmer, I can only say that it is the other way round. With so many ready-made package programs, (few of which will do exactly what the user wants), there seems to be no demand from anywhere for one-off programs. After all, with a suite that can take up to 200 hours to develop and de-bug, who will pay 200 x £10 when a package will do near enough for £200 to £500?

Friends in the retail trade (for PETs) tell me that they receive a continual trickle of enquiries from programmers who offer their services. The trade prefers to sell packages rather than act as brokers or intermediaries for programming.

It occurs to me that there is a need for a software brokerage facility; perhaps *PRINTOUT* might like to consider how this might be organised?

A.L. Minter,
Whitefriars Way,
Sandwich, Kent

We receive regular enquiries from readers in search of programming talent, so it would seem logical to try and bring the two together. Qualified programmers with professional experience are invited to contact Jonathan Horne on Odiham (025671) 2724 as soon as possible.

Geere Doesn't Like It

No, Gavin, I won't like it. Your one-liner in the January issue suffers from similar shortcomings to those outlined in my comments on Tommy's routine. I don't like what happens to LOG(ABS(N)) when N=0. I don't like the way the decimal points do not line up when -0.1<N<0.1, and do you really trust the computer to evaluate the ratio of two LOG functions without incurring a rounding error at some value? No Gavin, I don't like it. I refer you to the more cumbersome, but tested outline on p.10 of the same issue.

Ron Geere,
York Road,
Farnborough, Hants

We showed this to Gavin, and he said: "My, my, Ron's in an even testier mood than normal. But then most of the people who set themselves up as PET gurus get like that rather more often than's good for them. My goodness, all those 'I won't like' and 'I don't like' phrases. He'll be getting varicose veins, and then *how's he going to ride his bike? All I can say about Ron's comments is that I have used the line in question quite often, and never had a problem yet. Perhaps my numbers are more simple than Ron's. And it* was *only a suggestion!"*

Teacher's Missing PET

I would like to contact anyone who, like myself, is working with PETs in primary education. In this connection, why is Tandy the one to be making all the running in sales and marketing? They now loan machines and disks to schools, and train teachers, thus ensuring that when money is available Tandys are bought. If Commodore don't wake up soon they will miss the boat altogether.

Chris Thatcher,
Greycoat Road,
Coventry

We read your letter over to Commodore's education specialist, Nick Green. His reply:

"We have recently put on a highly successful series of seminars in London, Birmingham, Manchester, Bristol & Glasgow which were attended by 1,200 teachers in total. This was followed up by seminars at University College, London and the National Computing Centre in Manchester, on PET architecture for teachers of computer science, and teachers who are developing their own software. We have lent machines on an ad-hoc basis to teachers lecturing in the use of micros in the classroom and will continue to do so. We hope that in future teachers will come to the training centre in Slough (the opening of which is imminent) where we will be offering a full range of low cost training covering everything from introduction to micros at an appreciation level through to courses on data processing applications, and advanced courses on systems programming. Teachers who want to get the best out of their PET may like to contact their local software workshop, a list of which appears in Commodore's 'Microcomputers in Schools and Colleges.' Teachers having difficulty in obtaining a copy should contact me at 360 Euston Road, London N.W.1."

Dumb WAITer

I have a comment to make on Gavin Sanders' tip about the 'Press any key' syndrome where he recommends a WAIT 59410,4,4. I would argue with this on two points. Firstly, it is unnecessarily obscure and hence bad programming. Secondly, it leaves a space character in the keyboard queue which appears next time an INPUT or GET is executed, which could cause problems. To correct this you need to follow it with a POKE 158,0. More obscurity. What is wrong with: 100 GET A$: IF A$<>" " THEN 100? Nice and simple and CLEAR with it. Also his method will not work on the 8032 because the keyboard decode circuitry has been redesigned. WAIT 59410,4,4 will test for the '6' character on the top row of the main keyboard.

Chris Preston,
Tresham Road,
Birmingham

We showed this to Gavin and he said: "I'm not sure whether Chris Preston's missed the point or whether his *letter is obscure! I merely – and mildly – suggested one way round the essentially poor programming point of saying "PRESS ANY KEY" (something with which Chris seems neither to agree or disagree). There's nothing wrong with Chris Preston's suggestion – in fact, it's quite good. I must, however, say that using WAIT 59410,4,4 in dozens of programs has so far never produced a lurking and sinister space which later tripped the operation up. I am, however, very grateful to Chris for pointing out that the suggestion will* not *work on the 80-column PET – but then 80 column PETs are less likely, it seems to me, to be used for the sort of program in which this programming tip will be needed."*

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COMMODORE SUE PET'S INVENTOR

As forecast by Inside Trader, Commodore have filed suit in California against Chuck Peddle, father of the PET. Peddle recently resigned to set up his own company, and a number of Commodore's engineering staff have since left to join him. Commodore declined to comment on the case, but it is understood that they will allege that Peddle induced members of their staff to leave, taking with them the company's trade secrets.

NEW PRESIDENT FOR COMMODORE

Commodore's founder, Jack Tramiel has moved over to become Vice Chairman to make way for a new President, industry heavyweight, James Finke, a former Vice President and General Manager of Data General's European operation.

Although Tramiel retains the title of 'Chief Executive Officer', it is expected that he will now leave the day-to-day running of the company to Finke, and concentrate on overall strategy. "Decentralization and delegation are keystrokes of Commodore's future growth plans", he said.

It is interesting to note that prior to his association with Data General, Finke was General Manager of General Electric's Electrical Medical Division's international operations where he was specifically brought in to bring a loss-making business back into profit. Despite record profits last quarter, Wall Street analysts believe that Finke's first task will be to resolve the problems which have dogged Commodore's American sales effort. The PET is currently running a poor third (behind Tandy and Apple) in the U.S. sales table. In Europe, Commodore are number one.

The new President told PRINTOUT that he believed the company to be uniquely structured to meet the coming challenges, and capable of sustained growth. "what we shall be doing is to leverage our technology," he said.

SHOWSHOES FOR SPENCER

Kit Spencer, the face that decorated a thousand Commodore advertisements, has left his job as U.K. General Manager. Staff at the Slough headquarters were overcome by surprise and emotional scenes were reported.

Spencer is moving to Basel, Switzerland, where he will take on responsibility for marketing at CEL, Commodore's European operation. His languages include "English and some BASIC". CEL has been in a state of flux since the resignation of its director, Chris Fish, in November. Fish has since set up his own company, Sirius Computers, with Chuck Peddle (see story above).

Spencer is credited with much of the PET's success in the U.K., and his transfer to CEL is seen as a move towards converting it from an order-taking organization into an active marketing company.

The position of U.K. General Manager is being taken over by Bob Gleadow, another British manager with a reputation for toughness. Gleadow, who once gave his hobbies as "work and firing people", told PRINTOUT that he would not be starring in future Commodore advertisements. "It might be injurious to sales," he said.

STRUCTURED BASIC – FREE!

A structured BASIC language has been placed in the public domain. COMAL – it stands for Common Algorithmic Language – combines the simplicity of BASIC with the program structure of Pascal. Although previously only available on a few dedicated machines, it has already had a considerable effect on educational computing, where there was concern that the teaching of normal BASIC was not imparting good program discipline. Now CEL, Commodore's distribution company, have placed the language in the public domain, and PET users are free to copy and use it without payment or royalty.

The men behind this unusual gesture are Richard Pawson European software manager of CEL, and Borge Christensen, COMAL's Danish inventor. The development of the language for PET systems has lead to the compilation of more than 24k bytes of 6502 machine code. Christensen, a man of considerable wit and charm, told *PRINTOUT* that "PET COMAL is the best implementation of the original concept yet – both in terms of speed and new commands. And of course, having it in the PET range gives it the maximum possible exposure to schools and colleges in Europe."

The language's features include IF–THEN–ELSE–ENDIF, REPEAT–UNTIL and indented program lines. However, COMAL goes far beyond other attempts at structured BASIC by including long variable names and named procedures with true parameter passing, all of which make it ideally suited to the educational problem-solving environment. COMAL occupies 27K when loaded from disk but programs written in it are very much more compact than those written in standard PET BASIC. Copies are being distributed through Commodore's Education Workshops and User Groups.

Richard Pawson was last seen trying to convince a couple of sceptical journalists that COMAL stood for Commodore Approved Language.

AWAY WITH TRAILING WIRES

One of the principal factors in Commodore's decisive victory over Tandy on this side of the Atlantic, was that all the components of the original PET were contained in a single integral unit, whereas the TRS-80 was strung together like a rosary. If you subscribe, as we do, to the "less wires and funny boxes the better" philosophy, you will be interested in a new RS232 interface called Inpet. And that's exactly where it goes, as the picture illustrates.

Inpet is fully bi-directional and can slow the PET down to wait for the printer to catch up. In fact it is possible to select any baud rate between 100 and 9600, and the interface can be addressed to the IEEE bus as any device number between 1 and 15. There is also a facility for automatic conversion from PET lower case to true ASCII lower case.

Impetus, who are responsible for the Inpet, tell us that there is no difficulty communicating with other PETs, either directly or over the telephone, "unlike certain other new products." they mutter darkly. Installation doesn't involve any drilling, and they reckon it can be fitted by a non-expert in less than ten minutes.

Versions are available for all CBM and PET computers. Details from Impetus Computer Systems at Classic Offices, Hendon Central, London N.W.4.

The PIC-CHIP.... a powerful easy-to-use graphics facility for all New Rom PETs.

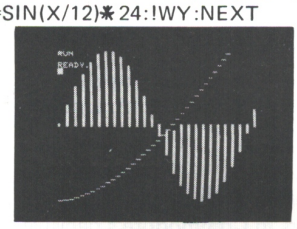
The PicChip is a ROM module which simply plugs into your PET making available immediately over forty new BASIC commands. These commands use BASIC variables as parameters (no PEEKing or POKEing) and enable the graphic possibilities of the PET to be fully exploited - even by beginners! Using an X, Y coordinate system based on an origin specified by program, lines, graphs and drawings of all kinds can be generated on the screen by simple programming. Other commands enable defined areas, or the whole of the screen, to be rolled or shifted up, down, left and right. Images can be stored to and retrieved from any RAM address.

Originally designed for **scientific** and **technical** applications, the PicChip is also being used in **educational projects, games** and **design work** of all kinds. The combination of fast plotting and area manipulation makes the PicChip ideal for the continuous display of real-time data in graphical form.

Just see how easy it is to use PicChip commands: the following examples were all photographed directly from a PET screen.

Picture 1 shows two curves, one drawn in fine-density and one in bar form, produced by two program lines:

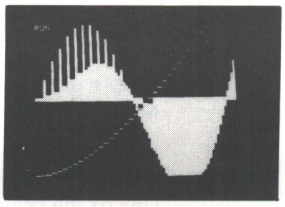
```
10 FOR X=0 TO 39:Y = X↑1.5:!WF:
NEXT
20 Y0=25:FOR X=0TO79 STEP 3:
Y=SIN(X/12)*24:!WY:NEXT
```



(1)

Picture 2 adds a third program line to plot a function as adjacent bars:

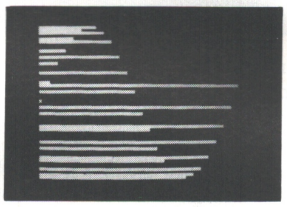
```
30 FOR X = 0 TO 79:Y=SIN(X/12)*
X/2:!WY:NEXT
```



(2)

If we just take the second program line and change !WY to !WX, the bars are plotted horizontally:

```
20 FOR X = 0 TO 79:Y=SIN(X/12)*24:
!WX:NEXT
```

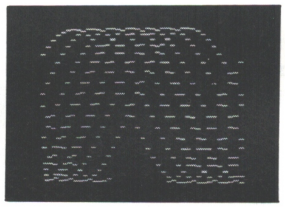


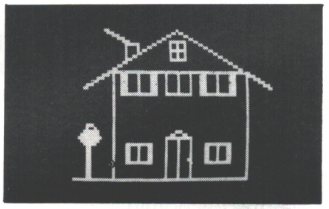
(3)

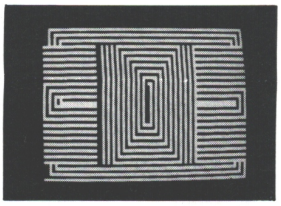
All the other pictures reproduced here were generated by the DEMONSTRATION PROGRAM included in the 20-page Handbook. What we can't show here are the amazing effects produced by shifting or rolling or otherwise manipulating different areas of the screen. There is even a repeat-key function, and commands for reading and setting the cursor position in X,Y co-ordinates.

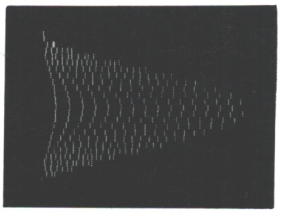
PicChip Functions.

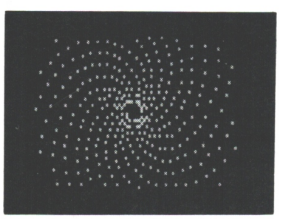
Command	Function
SYS	PicChip On
!RE	Restore screen
!CO	PicChip off
!RP	Repeat-Key on
!RO	Repeat-Key off
!CW	Cursor-position Write
!CR	Cursor-position Read
!AF	Area Fill
!AR	Area Reverse
!AN	Area Normal
!AI	Area Invert
!AS	Area in Shift case
!AU	Area in Unshift case
!AC	Area Case invert
!AF	Screen Fill
!SR	Screen Reverse
!SN	Screen Normal
!SI	Screen Invert
!SS	Screen in Shift case
!SU	Screen in Unshift case
!SC	Screen Case invert
!US	Up Shift
!DS	Down Shift
!LS	Left Shift
!RS	Right Shift
!UR	Up Roll
!DR	Down Roll
!LR	Left Roll
!RR	Right Roll
!WP	Write Point
!EP	Erase Point
!WL	Write Line
!EL	Erase Line
!WC	Write Continuous line
!EC	Erase Continuous line
!WX	Write bar in X axis
!EX	Erase bar in X axis
!WY	Write bar in Y axis
!EY	Erase bar in Y axis
!WF	Write fine Y
!EF	Erase fine Y
!FW	Write fine X
!FE	Erase fine X
!CS	Copy Screen
!PC	Poke Character











The standard PicChip plugs into socket UD4 of the PET, but is also available to fit either of the other two sockets. PicChip is therefore **compatible with other PET ROM packages.** Installation and use are fully described in the handbook.

The PicChip costs just £50 + VAT. To buy the handbook separately costs £5 but this may be offset against an eventual purchase of the chip. State required socket when ordering. **10% discount to educational institutions.**

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NODDY'S FRIEND

We just know you are going to want to meet 'Big Ears', the new speech recognition device from William Stuart Systems. The speech input system consists of a microphone, pre-amplifier, analogue frequency filters and digital interface. Naturally the software is provided.

To get the best out of Big Ears, you connect him to J2 and J3 at the back of your PET. And talk to him. Nicely. Actually, what you do is repeat a few words into his big ear while the system 'learns' them. No doubt some clever clogs will want to know how this is done. Analysis is by correlation over a statistical frequency plane which plots combinations of formants and harmonics throughout the speech waveform. How else?

This analysis is performed by programs in Basic with machine code input routines; they occupy about 5K and store 8 words. Thereafter each word takes up only 150 bytes, and theoretically you could store as many as you have memory for. In practice Big Ears gets a bit confused when it has two hundred or so words to compare. The solution is to nest them into perhaps ten headings, with ten sub-headings and so on down the tree, just as you would on a menu driven system.

At £49 + VAT but inclusive of postage, Big Ears sounds like remarkably good value for a fully assembled system. You can get one from William Stuart Systems Ltd., Dower House, Herongate, Brentwood, Essex. Tel. 0277-810244. They accept Access/Mastercharge and Barclaycard/Visa.

Here's looking at you, Noddy.

A SIGNAL FROM THE COMMODORE:

VIC now in production at 200 units a day.....The new 4022 tractor feed printer based on the Epson MX-80 delayed; but UK deliveries now reported imminent. Retail price £395 + VAT.....8061 and 8062 full size floppy drives to be shown at Hanover Fair and PET Show.....Also coming: CBM 8096, SuperPET with 96K RAM; also an add-on memory board..... Low cost mini floppy disk designated 2031 to be shown at PET Show.....Commodore's net income for six months to December 1980 was $10,304,000 compared to $6,145,000 in 1979.....75% of PETs sold in UK last quarter were 40 column. Of these a very high proportion were 8K PETs..... 8050 disk sales exceeded those of 8032 SuperPETs, indicating that many were being bought by existing users.....Expect CBM 10 Megabyte hard disk this autumn.....Rodney Welburn, late of Sperry Univac, has been appointed CBM Communications Manager.....A new keyboardless version of the CBM 8026 daisywheel printer is being introduced. Designated the 8027 it will sell for £850 + VAT.....Eventually *all* PETs will have a 12" screen with the 4000 series using only 40 columns.

PROCESSED WORDS

SuperPET plus *Wordcraft* or *Wordpro* offer better performance and value than dedicated wordprocessors costing three times the price. That was our conclusion after visiting the Info 81 exhibition held in London recently.

A word processing system based on the 80-column SuperPET with 1 megabyte (a million) characters of floppy disk storage, Commodore's new 8027 daisywheel printer and either *Wordcraft 80* or *WordPro 4+*, costs almost exactly £3,000. Yet none of the dedicated systems that we saw costing up to twice this amount could match the SuperPET's standard online storage capacity. And in most instances the software seemed to be generally less powerful and flexible than that offered by the PET systems.

Information about *WordPro 4+* is available from Professional Software of 153 High Street, Potters Bar, Herts) whilst Dataview of 9 Church Street, Colchester, Essex have details of *Wordcraft 80.*

DMS LINK

Both of these programs suffer from a limitation, in that whilst it is possible to store information that is used regularly, such as names and addresses, no facility exists to apply selection criteria prior to printing. Compsoft, who we once unintentionally referred to as Compost, have come up with a solution in the form of a link between their information storage and retrieval package, DMS, and *Wordcraft* or *WordPro.* The information can be stored in any format retrieved using several search criteria, and sorted on any field, either alphabetically or numerically. Calculations can be performed on any of the numeric information and the results stored or printed.

The word processing link allows you to specify who you want to write to, and then transfer details from the selected records to fill in the gaps in standard letters.

DMS costs £190. Information from the lovely Heather Kearsley at Compsoft, Old Manor Lane, Chilworth, Guildford, Surrey or any Commodore dealer.

FRENCH LETTERS

An advantage that some of the more expensive dedicated word processors have enjoyed over the PET systems, has been the ability to display foreign language text on screen, complete with accents, umlauts and all manner of funny characters. But no longer. Cytek of Manchester have just introduced a device called *Multifont,* which allows *Wordcraft* users to conjure up a whole range of different character sets.

Used in conjunction with any 32K PET and a Qume Sprint 5 daisywheel printer, *Multifont* enables the operator to see the effect of using the different print wheels without actually printing a document out. It is available at £172 + VAT in units offering Scientific, Legal, Commercial, European multi-lingual or non-European multi-lingual character sets.

Up to four different character sets can be stored in the computer at the same time, without making any demands on RAM. The first font is always the standard Commodore business set. To change fonts, the operator simply selects a different position on a switch. *Multifont* units intended for 8000 series SuperPETs are provided with three keyboard overlays that show the position of the special characters. Cytek will also prepare special character sets on request. Full details from them at Sandringham House, 9 Warwick Road, Old Trafford, Manchester.

WORDCRAFT PIRATES IDENTIFIED

Twenty five illicit copies of the original *Wordcraft* package have been tracked back to their source. Paul Handover, Managing Director of *Wordcraft* distributors, Dataview, told a conference of Commodore dealers about the pirated copies. A number of red faces were reported among the assembled dealers.

Diane Noy of Dataview later told *PRINTOUT* that the situation had come to light when users telephoning in with technical enquiries were asked for the serial numbers of their packages. The current version of the software *Wordcraft 80* is now supplied together with a "dongle" that plugs into the back of the PET. The program won't run without this device. According to Miss Noy, sales had risen dramatically after the "dongle" was introduced.

MACHINE LEVEL MAGIC

PETDOS can perhaps best be described as an attempt to introduce on a micro computer, techniques that have been standard in the minicomputer world for more than a decade. We had better add at this point that it is available only for new or old ROM 32K PETs equipped with CompuThink disk drives and a printer connected through the IEEE port.

To give you some idea of the scope of PETDOS, the manual extends to 180 pages which document the thirteen files on the system diskette. The intention has been to enable the user conveniently to cover a very wide spectrum of software development at assembler level. These would include applications for execution under DOS, stand-alone applications overlays and special function modules for SYS or USR execution from BASIC.

The system actually comprises two modules, PETDOS.GO, a co-resident Diskette Operating System in DISKMON Load & GO (Absolute) format, and PETDOS/EPT, a file of 220 standard mnemonics/symbols equated to associated values, facilitating convenient access to all services available under DOS. These routines and services are listed in a comprehensive specification available from Small Computer Development Services, 27 St. Martin's Drive, Walton-on-Thames, Surrey. The price is £115 + VAT.

YES, BUT WHAT USE IS IT?

Terry Hope and I were chatting the other day (and in case you don't, like most people, read the masthead of the magazine, Terry is our editor!). The conversation started with idle conjecture on the relative numbers of PETs in use in strictly business environments, as opposed to those in use in the home as the personal computer which PET started out by being.

It's a singularly elusive measurement to take, and neither of us have ever felt we actually knew, beyond any doubt, what the answer was. Nevertheless, we drifted from that general area on to home use of PET (and many are, of course, used in both situations by smaller home-based businesses, where the boss by day becomes the ardent hobbyist by night). And *that* discussion led us to a phenomenon with which a almost every home user will be familiar: the "yes, but what *use* is it?" syndrome.

If you have a PET at home, you'll have recognised the problem right away. You have friends round, and through the open door of your study/dining room/lounge/whatever they spot your PET. If you're the absolute (and fairly well-heeled) enthusiast, your PET may have looked really impressive through being flanked by a printer and possibly a disk unit.

"Good heavens, is that a computer?" they cry, in almost the same voice they'd have used if they'd seen a race-horse standing there instead. With well-simulated reticence you confess that it is, actually. "My, we never knew you were interested in *that* sort of thing," they say, striding towards PET and its peripherals, their tone of voice now subtly suggesting they've caught you out in some especially nasty personal habit.

On the defensive, you think quickly. What's the most spectacular program you have? Lightning-fast, your mind does its own version of a direct access database run, rummaging rapidly through remembered routines. "Aha," you say airily, "there's lots you don't know. If you've got a moment, I'll show you one or two of the things the computer – it's called PET, by the way – can do." Your friends brighten visibly, shedding overcoats, handbags and hats over the surrounding furniture as they draw chairs up in a reverent semi-circle round you and your computer.

It's at that point that you draw towards you your favourite program. Or, if you've been caught in this situation as often as I have, your favourite selection of programs. Each is fairly spectacular in its own right, either because of the dazzling graphics it uses, or the rapidity with which it'll do something, or the far-out novelty of its end-result, or even a combination of these, if you've chosen wisely and well.

Unimpressed Aunt

Hopefully, you've got a disk unit, because otherwise you'll have to run the gauntlet of a visibly deepening silence as a program loads from cassette for what seems like an eternity. The silence will eventually be broken by your least-favourite aunt, asking querulously after a none-too-surreptitious glance at her watch, whether it always takes this long. You mask the delay with bright chatter about this and that, and at long last the program is loaded.

(Infuriatingly, if you load from a disk unit, the reverse situation never occurs. No one will ever fall off their chair in paralysed amazement at the speed with which a long, long program goes from disk to memory.)

Ready to run, you briskly explain what's going to happen, using just enough detail to illuminate, but never enough to take the edge off the surprise you pleasantly anticipate will manifest itself in a few moments time, as the program gets under way. Your audience hitches itself closer, peering at the screen or printer intently. And off you go, persuading yet another lot of Doubting Thomases that the computer age has arrived.

Now for my part, the routine I follow is so well-established that I have occasional doubts about it all looking just a mite *too* slick. For instance, I almost always run a biorhythm program first (carefully pointing out that PET calculates the number of days the subject's been alive in the instant between pressing 'return' and the printer starting its performance).

Then I flow smoothly into a fast database demo, using a file of personal data I've put together on sixty or so acquaintances (with, I hasten to add, their whole-hearted co-operation!). This always knocks the audience backwards, especially when they sorrowfully focus on the fact that the birthday cards they always get from Gavin don't demonstrate the caring side of Sanders' nature, merely the infallibility of his database.

Next comes a program from Cursor (readers will remember my long-time love affair with this excellent US cassette-based program collection)*. The one I use is Word Search, which I've mentioned in an earlier column.

Then finally I swing into a PET music program, using the terrific machine-code four-part harmony program suite written by Gene Beals.* This totally zaps the watchers, especially when the music they can hear actually appears on the screen at the same time.

And after it's all over, and I'm sitting back with a smug look on my face, there inevitably comes the *coup-de-grace,* usually administered by the unfavourite aunt. "Yes," she sniffs, "that's all very well, and quite clever too, I suppose, but what *use* is it?".

I'm still working on the answer to that one, without a positive guarantee of success so far. What do others do in similar circumstances, I ask myself?

LIFEMEN OF THE WORLD, UNITE!

It's possible to split the world into two groups in dozens of different ways. To be sombre, 'haves' and 'have-nots'. To be psychological, 'day' people and 'night' people. In a programming sense, Basic plodders (like me, for instance), and iridescent machine-code minders. And yet another way is those who get terribly turned-on by the game of "Life" and those who don't see what all the fuss is about.

I'm afraid I tend to be in the latter camp, but first let me remind you what "Life" actually is. Quite a long time ago, someone called John Martin Gardner (he's a regular columnist for the august magazine 'Scientific American'), invented a sort of game he called "Life". It's played, if 'played' is the

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right word, on a board marked off into many small squares.

Counters are placed in any number on any of the squares, one per square. Each counter represents a living cell, and from then on, certain immutable laws apply.

Without going into masses of detail, cells either die from isolation or overcrowding, based on the population of the 8 squares surrounding each single square; or cells are born if the conditions are right. It took ages for a human player to work through each generation, and Gardner's concept only really took off when the idea could be simulated on a computer.

Since then, innumerable Life variations have appeared. Some find them entertaining to the point of becoming obsessive about the whole thing; others find the screen display of successive generations mildly diverting for a while, but then tend to tire of it all.

Well, all this is by way of mentioning one of the cleverest programs to come my way for quite a while — the very latest version of 'Life', marketed by none other than Commodore themselves. I've already said that I'm no great 'Life' enthusiast, but I must confess to playing with the CBM program in fascination for hours on end. I loved it, in a phrase.

It has features even hardened 'Life' enthusiasts won't believe, and breaks through boundaries that have previously limited 'Life' simulations on a computer, especially PET's 40-column screen. If you're looking for a clever machine-code (because that's what it uses to get stunning effects) program, that'll certainly keep you occupied for hours, if not days, get it. And if you're a 'Life' enthusiast of even the most tepid kind, you can't afford not to have it.

Commodore's announcement of it, and description too, didn't do it anything like justice. I hope this quick summary has helped to redress the balance.**

TRICKS FOR THE 80–COLUMN

Forewarned is forearmed — here are two of the most useless things you're likely to read for a long time about your 80-column PET. But if they don't divert and entertain you, you'll get the Gavin Gold for this month for being the most insensitive person around!

Are you ready? Right, here we go.....

For your first trick, you're going to need to use your Repeat key, your "greater than" key and, of course, your Shift key. The latter is necessary, you'll hardly need to be told, because the "greater than" sign is a shifted character on the 80-column PET. Use the right-hand shift key, please.

OK, press the right-hand shift key and the "greater than" key, and then press the Repeat key. What do you get? Why, a continuously repeated row of *"less than"* signs.

Actually, I didn't want to tell you what would happen, because it spoils the fun a bit, but if I hadn't said, I'd have had hordes of ravening 40-column people out there, all complaining bitterly at being left mystified.

Don't ask me *why* you get "less than" signs when you use the Repeat key on the "greater than" sign. Just be happy that you do!

Now for your second trick. Clear the screen of all those stupid signs and enter, as a direct command, the word PRINT, followed by a double quote, the 'clear screen' character, and another double quote. Follow that immediately with a semi-colon, a colon, and SYS54265.

Done all that? Fine. Now press Return to activate your direct command, and prepare to fall back in amazement. I'll bet you didn't know you had *that* amount of memory available, did you?

Sorry, 40-column folk. What happens when you do that is this. The screen clears (as you might expect) and up comes the familiar start-up words "COMMODORE BASIC" with, on the line below, the indication of available memory, just as usual. What *isn't* usual is the size of the indication, for it says, bold as brass, "44030 bytes free".

The reason puts a human face on the folks at Commodore and Microsoft (bet you thought they didn't have one). It seems that once upon a time, long ago when the 80-column was being developed, it was originally intended to have a fatter memory than it finished up with. The Microsoft people therefore programmed a nice big memory figure into their ROMs, but forgot to take it out again at a later stage of development.

By gosh, that makes me feel good. It's nice to know we plebs aren't the only ones to make mistakes!

THE KLEENEX TISSUE CORNER

I've tried, oh heavens, how I've tried to up-grade my PET to Basic 4.0 — and (sob!) how miserably I've failed so far.

In theory, upgrading to the new Basic is a simple matter of unplugging some existing chips and plugging new ones in. In theory.

Not that I really wanted to, you understand, but I felt I at least ought to have a go at the new Basic 4.0 simply so that I could report on what I found on the sunlit highlands of a super-sophisticated version of the dear old Basic 2.0 we've all come to know and love so well.

Well, like I say, I've tried and failed. Five attempts and dozens of double-checks later, absolutely *all* I get with my Basic 4.0 chips plugged in is a screen of absolutely immovable hash. The very same hash, in fact, that you get when you first power-up. Excepting that *my* hash doesn't go away — it just obdurately sits there.

The funny thing is that I've now heard of six or seven similar cases, dotted around the country. I thought I was the only one, stuck with an obscure memory reset fault somewhere deep inside my particular PET. Not so, it seems.

Which leads me to ask you now whether *you've* had the same problem, or know of someone who has. I'll collate any response I get, for it might be there's a problem with up-grading to Basic 4.0 that's not yet widely known.

*Marketed here by Audiogenic, P.O. Box 88, Reading, Berks.

** For more information on Life, see 'LIFE on a PET' on page 21 of Volume 1 No. 5, May 1980.

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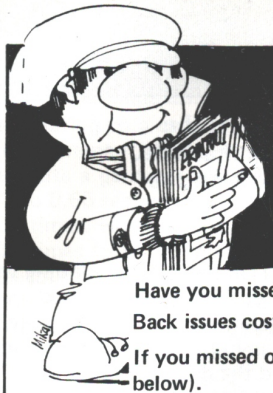

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1. December 1979
PET in education – Survey of Business Software – Double Density Plotting – Jim Butterfield Interview – Photography Course review – The Changing Face of Commodore – Read/ Write : Your questions answered* – Hotline News & Products* – Pets & Pieces column* – Peeks & Pokes : gossip*

2. January 1980
PET in Public Relations – A Visit to the Commodore – CompuThink Disk Drive evaluation – Survey of Programing Aids – PET's Video Logic – WordPro II review – Modular Programming (article & listing) – Basic ROM addresses.

3. Feb/March 1980
Speech Synthesis on PET – HitchHiker's Guide to PET : review – Commodore 3040 Disk Drive evaluated – PET Games : report – New Approach to Subroutines – Tokens in Basic – Petaid review – Analogue to Digital devices – The PET Keyboard.

4. April 1980
Commodore Printer evaluated – Commodore's New Technology : report from USA – Kit Spencer Interview – PET as Secret Agent – Assembly Language programming aids – Commodore Assembler reviewed – 6502 Assembly Language Programming : Book review – Tommy's Tips* : Software problems solved.

5. May 1980
Personal Electronic Transactions* : Formatting numbers – Hardware Repeat key : review – High Resolution Graphics : Review and User Report – CompuThink 800K disk drive : test – The Game of LIFE – PET User Groups – Educational Software reviewed.

6. June 1980
PET Show Guide – 8050 SuperPET : full evaluation – Book review* – Fantasy Simulations reviewed – Interview with Commodore's founder – PET Tokens for text – Hanover Fair Report.

7. July/August 1980
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8. September 1980
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9. October 1980
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10. Christmas 1980
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SuperPET

It is six months now since Commodore launched their contender for the business market, the big screen CBM 8032. Since then we have learned a great deal more about this interesting machine. Independent software specialist, CHRISTOPHER PRESTON, presents a Half Term Report on the SuperPET.

A General View of the 8032

First, a brief description of the 8032 for those readers who missed Jim Butterfield's preview in our June 1980 issue.

The 8032 is based on the MOS Technology 6502 microprocessor, as are many of its competitors. It contains 32K bytes of internal memory useable for BASIC programs; rather less than some of the newer machines available, but sufficient for 95% of business applications. Its screen is 80 characters wide, making it the only mainstream microcomputer with this capability as standard; this must be rated a definite plus point for business users. As far as its peripheral devices are concerned, Commodore also manufacture a 1 megabyte disk drive, the 8050 (using two 5-inch floppies holding 500K bytes each), a fast dot matrix printer (the 8024) and shortly a letter quality printer (the 8026). In addition, there are numerous other printers by outside manufacturers compatible with the 8032 (see the report in the January 1981 edition of PRINTOUT). The fact that all the hardware is available from the same manufacturer and dealer is a great help to a first time user. In the pipeline from Commodore are a 2 MByte floppy disk using 8-inch drives, and a 10 MByte hard disk unit.

As far as more technical matters are concerned, all the top three or four microcomputers are fairly similar in performance, but where the PET really scores is in the vast amount of software and hardware available in this country to the average business user. A brief survey of the advertisements in this issue will provide a list of several suppliers of commercial, communications and games software. It is this which makes the PET such a good buy, rather than the exact time taken to do a floating point multiplication.

The 8032 is supplied with a User Manual, about which we have mixed feelings. To the new user who has bought his PET simply to run other people's software, it will be a great boon, taking him step-by-step through the essentials of plugging in his machine and getting it running. However, to anybody intending to write his own software, the manual will be of very limited usefulness; we hope that Commodore have a technical manual on the way. Until then it will be necessary to rely on disparate other sources.

Physical Appearance

We now enter the critical part of the review, using the word critical in its correct sense. A brief comparison of the 8032 and its predecessor, the 3032 shows little in the way of abrupt change and a great deal in the way of healthy evolution. As mentioned, the screen is now 80 characters in width, thus doubling the amount of data that can be presented to the user. The screen can also now be split into a 'scrolling window' and a fixed part. The scrolling window is the part of the screen which scrolls up when the bottom of the screen is reached. This normally fills the whole of the screen area, but by means of the new control characters described below, it is now possible to reduce this so that only part of the screen scrolls. The cursor control keys, HOME and CLR only operate within the window. The RVS key no longer slows down scrolling; this function is now performed by the left arrow key, to be found at the top left hand corner of the new keyboard. Scrolling may be stopped completely by pressing the colon; the left arrow is used to restart.

The other major physical change is the keyboard, which has been replaced with a more conventional, almost IBM-like unit, with a numeric keypad just to the right. The top row contains the digits 0-9; the characters !"#$%'&*() being obtainable by using the SHIFT key, as on a normal typewriter. This is obviously intended to make the machine more immediately useable by the typical secretary or punch girl, but for those of us used to the previous keyboard, the change is a little awkward at first. To the right hand side of the main keyboard are the cursor controls, the INSERT/DELETE and CLR/HOME keys, and the RUN/STOP key all surrounding the much used RETURN key. This is definitely not a Good Thing. A fair amount of care is required to hit the correct key if one is not a 2000 character-an-hour expert. The numeric keypad contains the digits 0 - 9 and the decimal point, but no minus sign or RETURN key, which makes it of limited usefulness for most types of purely numeric entry. The cursor control, INST/DEL and space keys are auto repeat, which means that if they are held down for about half a second, they repeat at a rate of about twenty characters per second. For the other keys a REPEAT key is provided which performs much the same function. The RUN/STOP key has slightly changed its function: instead of loading the first file from tape, it loads the first file from drive 0 of the disk drive.

The Hardware

As far as the hardware inside is concerned, the main logic board has been redesigned, but the all-important ports (IEEE, User and Cassette) remain unchanged, except that the second cassette port is now alongside the memory expansion port. The new PET is also provided with an audible buzzer, which sounds when the machine is first turned on. The buzzer normally sounds a rapid sequence of notes lasting about a second, and can be produced by PRINT CHR$(7). It is possible to produce a constant tone, however, (see below). The buzzer also sounds when the cursor is approaching the right hand margin of the scrolling window, in similar fashion to a typewriter bell.

The Software

It is in the realm of the operating system and the BASIC interpreter that the major changes occur. These have increased in size from 16 to 20 kbytes. However, Commodore appear to have learnt their lesson as far as this is concerned, and there should be no problems with converting existing software. The zero-page locations are virtually unchanged (unlike the zero page in the 8050 which is totally different to the 3040), apart from the large area which was used in the 3032 to allow 80 character text lines occupying two screen lines. With the new screen width this is redundant, and is used for a number of useful new features. The locations of the various routines in ROM have changed, of course, and interested readers are referred to 'The Hitch-Hiker's Guide to the PET', published by ACT Microsoft Ltd., which now includes a full description of all the changes. One alteration which will affect some machine code programs is the fact that the second cassette buffer is now quite heavily used by the operating system for the new disk commands, and to control the TAB key (see below). Any machine code programs using this buffer should be relocated, possibly to the first cassette buffer if this is not in use.

Major changes in the operating system include 13 new control characters now added to the existing cursor controls, INSERT and DELETE etc. More of these later. Programmers wishing to write their own input and output routines will be pleased to learn that both these are now controlled through vectors (like the interrupt vector). The BASIC Interpreter (which is now called BASIC 4.0, as opposed to the 3032 BASIC which is designated BASIC 2.0) includes two major improvements.

Firstly, all the awkward disk commands, such as NEW, COPY, etc. have been incorporated into the BASIC language; for these see our report on the 8050 disk drive in the January 1981 issue.

Secondly, garbage collection has been almost entirely eliminated. Garbage collection is the nasty habit the PET used to have, of appearing to go completely dead for periods of time, while it was clearing out all the string variables it had finished with. We have been given some timings by Commo-

dore, relating to a special program written to demonstrate the improvement. These show a reduction in the time taken to execute a garbage collection from 21.56 minutes on the 3032 to 0.65 seconds on the 8032, an improvement of almost 2,000 times. However, don't expect your programs to run 2,000 times faster on the 8032; garbage collection is barely noticeable in most programs.

Commodore claim to have cured all known bugs present in BASIC 2. These are as follows:

1. IEEE devices causing the Interpreter to hang up by returning a status of 1.
2. The 41st or 81st GET on a line returned garbage; the 256th returned the first character of the line.
3. Screen scrolling disturbed the INPUT statement, appending the INPUT prompt to the input string.
4. It is now possible to disable the IEEE timeout, to allow the PET to be used with slow devices such as graph plotters (see below).
5. Write to screen is now faster because the software does not have to wait for the screen to be blanked during the vertical retrace before updating the screen memory.
6. The TI$ function used to lose time when the screen scrolled.
7. The software used to always send a line feed after a carriage return, which was why we had to say PRINT#4,A$;CHR$(13); when writing to disk. This now only happens if the file number is greater than 127. However, this could cause problems with some printers if using 3032 software on the 8032 as file number 4, for example, no longer sends a Line Feed.
8. If, during an INPUT or INPUT#, more than 80 characters are read, a 'STRING TOO LONG' error is generated.

Screen Control Characters

As mentioned above, there are now 13 new control characters. As these are not described in the user manual, we think now is a good time to give them an airing. They are as follows:

ESCAPE. Apart from producing the ASCII character ESC (code 27), which is much used in communications, this key is useful in that it removes the PET from 'insert mode', after keying a quote or a number of insert characters. This is a separate key on the main keyboard.

TAB. It is now possible to set a number of tab stops by positioning the cursor in the correct column, and pressing SHIFT–TAB or printing CHR$(137), which sets a tab stop in the column, or will clear a tab stop which was there previously. The TAB key on its own, CHR$(9), will move the cursor immediately from its current position to the next tab stop. This is very handy if programming tables, but is complicated by the fact that you cannot tell if SHIFT–TAB is setting or clearing a tab stop; it all depends upon whether one was already present or not.

BELL. This character, CHR$(7), sounds the built-in buzzer.

DEL LINE. Deletes the line containing the cursor and scrolls the rest up. CHR$(21).

INSERT LINE. Inserts a new line at the current cursor position, and scrolls the rest of the screen down. CHR$(149).

ERASE BEGIN. Blanks all the characters on the current screen line up to the current cursor position. CHR$(150).

ERASE END. Blanks all the characters on the current screen line from the cursor to the end of the line. CHR$(22).

GRAPHIC. The 8032, when first turned on, displays upper and lower case letters. This character turns the PET into graphic mode, which is the mode the 3032 powers up in. It also reduces the spacing between the lines to allow continuous graphic displays to be drawn. POKE 59468,12 will leave gaps between the lines. CHR$(142).

TEXT. Returns the PET to lower case mode. POKE 59468,14 will not open up the spacing between the lines. CHR$(14).

SCROLL DOWN. Scrolls the scrolling window down one line. CHR$(153).

SCROLL UP. Scrolls the scrolling window up one line. CHR$(25).

SET TOP. Sets the current cursor position as the top left hand corner of the scrolling window. Pressing HOME twice will restore the window to its normal size. CHR$(15).

SET BOTTOM. Sets the current cursor position as the bottom right hand corner of the scrolling window. Pressing HOME twice will restore the window to its normal size. CHR$(143).

New POKE Commands

We will also include a selection of some of the new POKE commands available on the 8032. These are taken from the new edition of 'The Hitch-Hiker's Guide to the PET'.

Location 144. This is the location used to disable the STOP key, which is now done by POKE 144,88. POKE 144,85 returns to normal.

Location 227. It is possible on the 8032 to 'type ahead', that is, key in data before the PET is really ready for it. This is stored in a small buffer called the keyboard queue. Normally, only 9 characters can be keyed in like this, but by POKEing this location with a number (up to 80), this can be increased or decreased at will. Any characters above the first 9 are stored in the first cassette buffer. Note that when the limit is reached the 8032 simply stops accepting new characters; the 3032 used to throw away those it had and start again.

Location 231. This location normally contains 16, and controls the speed of the notes produced by the buzzer. Higher values slow it down; POKE 231,0 stops the buzzer completely.

Locations 233, 234. These two locations (E9, EA in hex) are the vector to the keyboard input routine. Assembler programmers can use these locations to write their own input routines.

Locations 235, 236. These two locations (EB, EC in hex) are the equivalent vector to the screen output routine.

Location 1020. POKEing this location with 128 will disable the IEEE timeout limit of 64ms. If this is done and the PET hangs up waiting for a slow (or faulty) peripheral, it can be interrupted by the STOP key.

Here is a short program to produce a constant note from the buzzer:

```
POKE 59467,16
POKE 59466,15
POKE 59464,X
```

The value in the variable X decides the pitch of the note.

POKE 59467,0:POKE 59466,0 is used to turn the note off.

Reliability

We have been using 8032 and 8050 combinations continuously for several months without experiencing the slightest trouble with any of them, nor have we heard of anyone encountering serious problems. Commodore's reputation for reliability is on the whole good, and the 8000 series equipment seems likely to maintain it.

Conclusion

The 8032 SuperPET represents a significant improvement on the 3032. Whilst maintaining a definite policy of increasing the power of the PET, Commodore are being careful not to alienate existing users, as occurred with the arrival of 'New ROM' PET two years ago. Compared with other machines on the market, the 8032 represents a higher standard of design and manufacture than most; but to repeat an earlier point, where the Commodore machines really score is in the vast range of software and hardware products on sale; and their availability and reliability; and in the number and quality of Commodore dealers able and willing to solve their customers' problems.

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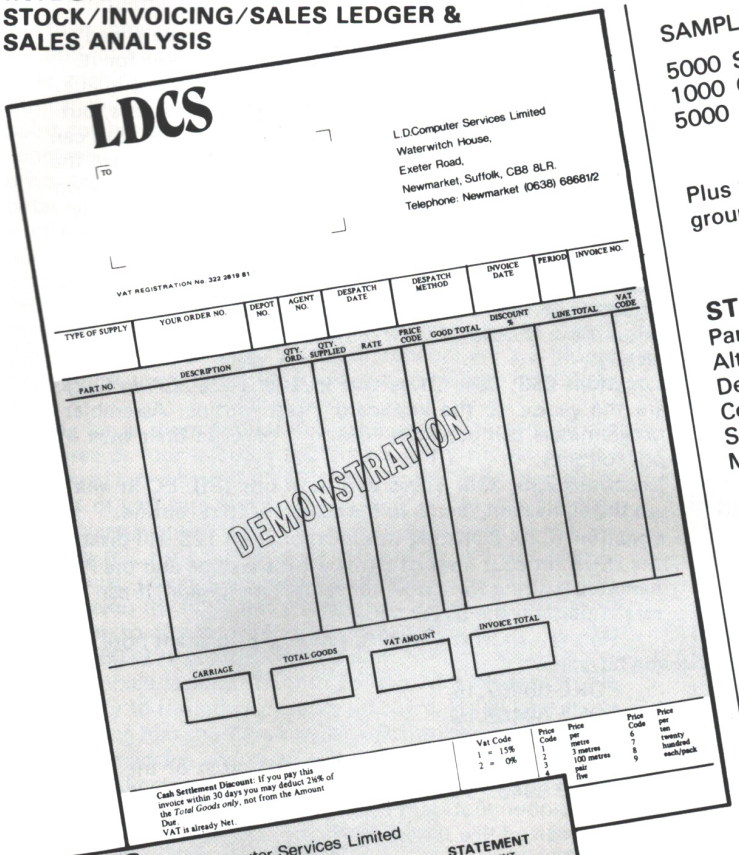

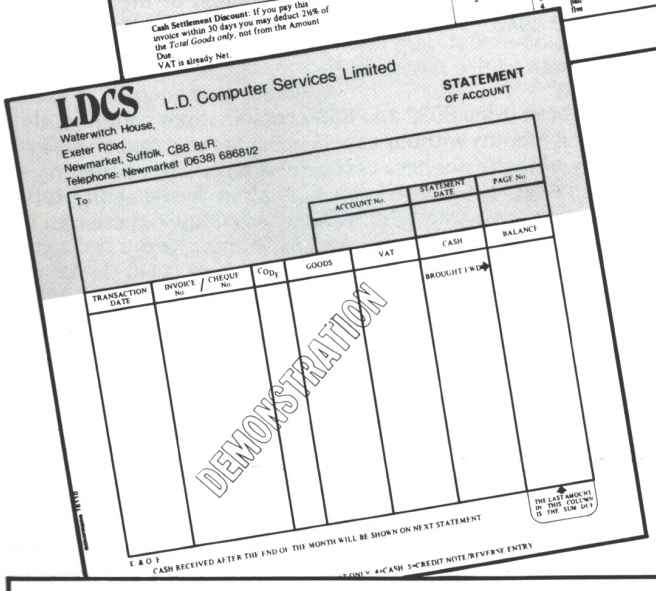

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BUSINESS SOFTWARE – Who publishes what

An up to the minute guide to the most widely used categories of business software.

Many of these programs, including all of those put out by major publishers like Commodore and Petsoft, are available through PET dealers. We think it is worth buying through a dealer in order to obtain installation and local support. A limited telephone backup service is offered by almost all publishers free of charge.

Most dealers have their preferences, and generally their advice seems to be quite good. However, we do think it is worth contacting *all* of the publishers offering a particular type of package, and requesting a full specification with sample printouts. We would also draw your attention to the reviews published in past issues of the magazine.

How to use the guide

First select the column indicating the type of program you are looking for. A price or the letters POA (Price On Application) will be found against the names of software publishers offering a package in the category. A list of addresses appears at the foot of the page.

Each publisher is numbered. These key numbers appear against a list of various specialist applications for which they offer packages.

Notes: Commodore programs are available by mail order only from Audiogenic.

Petsoft have changed their name to ACT Microsoft Ltd.

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3 Anagram Systems				399	299														
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6 Bristol Software Factory				300	300				300										
7 Claremont Controls																			
8 CM Mainopt Ltd.				200+	200+	200+			200+	200+									
9 Commodore Systems											170+								
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No. 2 Amplicon Microsystems Ltd., 143 Ditchling Road, Brighton, E. Sussex
No. 3 Anagram Systems, 9 Mitchell Close, Horsham, W. Sussex
No. 4 Arden Data Processing, Municipal Buildings, Charles Street, Leicester
No. 5 Audiogenic, P. O. Box, 88, Reading, Berks
No. 6 Bristol Software Factory, Strathearn House, 88 Queens Road, Clifton, Avon
No. 7 Claremont Controls, Claremont Road, Chimney Mill, Newcastle upon Tyne
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No.31 Petpac, 45 Woodhill, Leicester
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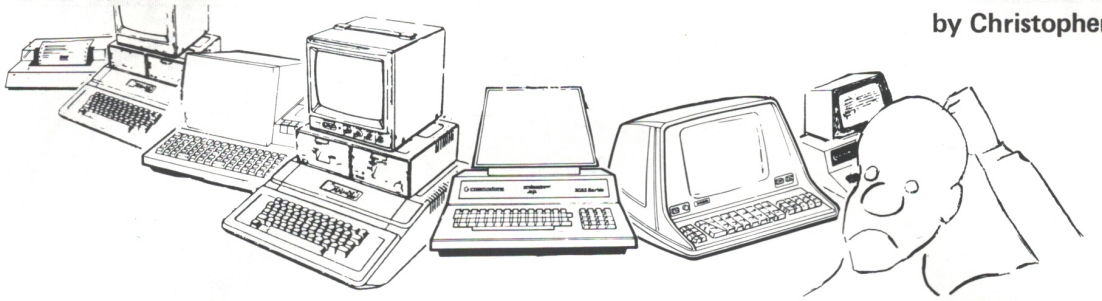
HOW TO BUY A COMPUTER

by Christopher Preston



In these times of economic hardship and industrial unrest, more and more small and medium businesses are looking to the new microcomputers for assistance. Unfortunately, the market is, if anything, even more cutthroat than the traditional 'caveat emptor' areas of life insurance and second-hand cars. This short article is not intended to prove that machine XYZ is better or worse than machine ABC, but rather to give some gentle advice to the businessman who finds himself somewhat perplexed by the onslaught of claims and counter-claims, usually couched in technical jargon he does not understand.

One of the first things to understand is that you are not buying a computer; what you are buying is a piece of software that happens to run on a particular computer. The ABC machine may be better, cheaper, easier to get and possibly slightly more reliable, but in the end it is the software it contains that decides whether or not your new acquisition will double your money, or give you just one more headache. The most important criteria are:

1. *Does this piece of software do what you want it to do? Does it do it quickly, reliably and fairly easily?*
2. *Does the machine upon which this software runs have a good reputation for reliability?*

It should be noted that these points are arranged more or less in descending order of importance. Let us consider them in more detail.

I repeat: the greatest priority must be given to the choosing of software.

Never buy business software without a full demonstration. Insist on a detailed printed description which you can study at your leisure, not a double sided piece of A5 glossy paper, and preferably (even if it means paying a nominal sum) the actual instruction manual for the system. Do not be afraid to ask the salesman any questions you may have. He will not laugh at your ignorance; or if he does you will know better than to buy your system from his company. If there are parts of your business which you feel the system you are looking at cannot handle, ask: "Can this payroll system pay weekly, monthly and four-weekly?" "Our Chairman has a tax code of 3500H. Can the program handle it?" In many cases, if you are buying from a reputable software house, it will be possible to have the company modify the program to suit your business, although they will, of course, charge for this. It is wiser to obtain a quotation at this stage rather than once you've bought the system and the shop floor are up in arms because they haven't been paid for two weeks.

Try to get details of how long the system has been on sale; how many systems have been installed; are there any enhancements forthcoming? You can even try, although do not be too hopeful, to get testimonials from existing customers. Do not hesitate to use the grapevine. If one of your bookkeepers has a friend whose company installed such and such a system last year, try and get an introduction; talk to the friend as well as his Managing Director. They will almost certainly tell you things no salesman ever will about that particular system and computer systems in general.

The Sales Demo

It is difficult during a demonstration to get a true feel for how easy a system will be to use. One that appears at first glance exceedingly abstruse may be just the thing you are searching for. However, beware the 'User-Friendly' system. This is *the* buzz word at the moment; it usually means that the system constantly bombards you with requests for confirmation. "Do you wish to put A. Jones & Co. on the stop list? Enter Y or N". "Are you sure? Enter Y or N". "Are you sure that you are sure? Enter Y or N". This approach has the advantage that during the demonstration at least, the prospective customer will feel that here is a piece of software which will guide him or his secretary through the mysteries of life to the pot of gold at the end of the rainbow. This invariably proves a disastrous mistake. *You* should do the leading, make the decisions, not the computer. All the computer is there for is to do the calculations and print the results in a meaningful form. With any new system, life will become slightly confusing at first; then, as you become familar with the procedures, you will find yourselves progressing with the minimum of distraction. After a fortnight with the 'user-friendly' system described above, you will be tearing your hair out.

The question of reliability of software and hardware now rears its ugly head. Unfortunately, there is no way to gauge reliability during a demonstration. Again, make use of the grapevine. Very few magazines print serious complaints about particular pieces of software; they are too cagey about their advertising revenue for that. *(PRINTOUT will, and we have the solicitors letters to prove it!* — Ed). It is a sad fact that microcomputer software in general is not as reliable as it could and should be. Hardware, as a rule, is pretty reliable these days, and the grapevine is quite vociferous about that which isn't.

Up and Running

This brings us quite neatly to what happens after you've signed the contract. First of all, if you are buying a piece of software which is vital to your business, such as a Ledger or Payroll, then you must have the person who is to use the system *and at least one other,* fully trained in the complexities of the system. This usually involves having a demonstrator or training person virtually living in your offices for a week or two. This again will cost you money, typically £200 per week; it will be money well spent. Ask yourself this question: "Would I sack my accountant and turn over my business to an untrained person, send them all my sales invoices and all the remittances I receive?" That, in effect, is what you are doing. Admittedly a good computer system should be almost foolproof, unlike a half full ledger card, but the principle remains the same. You must know what you are doing. Don't forget that if you are buying one of the 'off the shelf' packages now available for under £200, the gross dealer profit on the sale is only about £80, out of which he has to pay his running expenses; you cannot expect much support once you have taken the stuff off his hands. This is no criticism of 'off the shelf' software; on the contrary, much of it is excellent, but what you must realise is that you will have to pay extra for proper training and support.

There are ways you can protect yourself from disaster by taking sensible precautions. Machines do break down, so it is wise to take out a service contract with a reputable service agent, normally the company from whom the machine was bought. The annual contract will be between 10% and 15% of the capital cost of the hardware. In return you receive a promise that, should your hardware break down, it will be repaired or replaced within 24 hours, parts and labour free.

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Contributions should be typed double-spaced with extra wide margins and accompanied by any relevant photographs or illustrations. We prefer listings made on a Commodore or other printer capable of generating PET graphic and other special characters, although this is not essential. Authors should retain their own copy of material sent to us.

Where programs are being submitted, details of the name and address of the author and a brief description should be entered in REM statements, together with a note of equipment used to prepare the cassette or diskette. This information should also be included in the documentation. We ask you to certify that all material is original. Copyright on unsolicited material will remain vested in the author.

PRINTOUT is happy to pay for articles and fully documented programs used at our prevailing rates. In order to avoid duplication of effort, it may be adviseable to write before starting work on an uncommissioned article.

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BUZBY'S CHRISTMAS BUG

The Post Office apologises to readers who did not receive the January issue of PRINTOUT due to the misdirection of a sack of mail over the Christmas holiday. Any reader missing this issue is invited to write to the Circulation Manager, PRINTOUT, P.O. Box 48, Newbury, Berkshire RG16 OBD, quoting their name and address as it appears on the address label.

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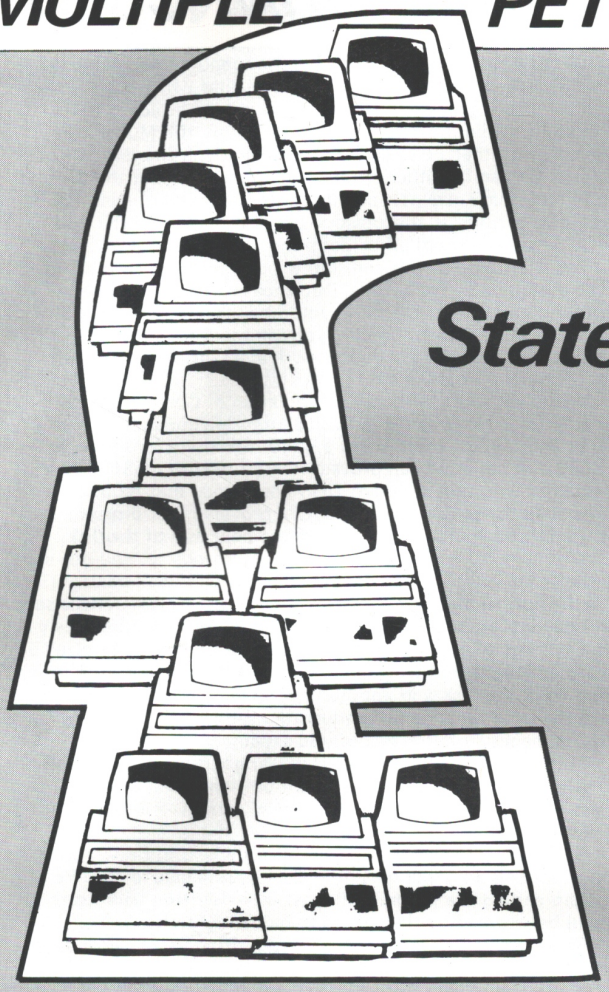
MULTIPLE PETS AT MINIMUM COST



State of the Art Report

by DENNIS JARRETT

COST SAVINGS ON MULTIPLE PETS

These figures came from Kobra, but Taylor-Wilson's MPS product wouldn't look so very different in total capital outlay.

The example is three PETs in a Mupet network sharing one 3040 disk and a 3022 tractor feed printer – by comparison with an installation where each PET has its own printer.

	Stand-alone	Mupet
32K PETs @ £625	1875	1875
3040 disk drives @ £695	2085	695
3022 printers @ £425	1275	425
cabling	135	45
Mupet	-	595
total	**£5370**	**£3635**
Additional PET configuration	**1790**	**796**
3040 disk drives @ £695	**Stand-alone**	**Mupet**

"It's not a PET-to-PET communicator" says Kobra's Dave Whitehead. "Nor is it a multi-user operating system. Its sole purpose is to control IEEE-connected devices, sharing access by several PETs to an expensive device like a disk or a fancy printer." And that's as neat a summary of the multi-PET world as you'll get.

Sharing resources is the name of the game. The reason why small computers are so much cheaper than large computers is fairly obvious – they're a lot more limited. And this means in particular that they have limited resources in terms of CPU performance, memory size and speed, and I/O ports. With that spec a microcomputer can perform quite adequately for a single user running one program at a time – but there isn't much capacity available for more than one user or more than one program.

Nor is the operating system equipped to provide those things. You'd need some relatively complicated control software – which means you would have a large chunk of your meagre memory and many of the available machine cycles permanently taken up by the operating system.

Things are complicated slightly by another factor, the attraction of up-to-date extras – in particular the correspondence-quality printer (£950 to £1600) and disks (£625 or more for 347KB). You'd like them, because fast-access storage and word processing are two eminently sensible features on any computer. But they take the *total* price of the system into a different league. Mechanical and electro-mechanical devices like those can't get much cheaper, while the cost of all-electronic components has plummetted.

But even if you bought a daisywheel printer for word processing, you'd be hard put to use it more than 20 per cent of the available time. And that kinda implies if there was some way for *five* people to use the one printer alternately, everyone could do top-grade printing at a fifth of the cost .....

What's Available

Enter the shared-resource PET system. Currently there are two and a half on offer in the U.K., and they all work more or less the same way: multiple PETs are cable-connected to one or more shared devices, typically disks and maybe a decent printer. It's obvious that if you want to optimise the use of clever peripherals you should let more than one user get at them: but the PET runs out of steam if you try to let several people access them through the one small computer: so you give each user a separate piece of CPU and memory, the cheapest elements of a modern computer configuration, and let them share the expensive bits: hey presto, economical multi-user computing!

The insert indicates what kind of savings you could expect on a minimum system. Using the bigger disks and a letter-quality printer makes the figures even more impressive. If your PETs need to access the disk a great deal it is probably better to buy separate disk drives for each: but at a total saving per user of £1,735 it might be worth thinking about the exact amount of time each disk is actually going to be used.

Meanwhile, keep your eyes open for true multi-user operating systems on the PET. With the arrival of the long-awaited mini-Winchester for 14 megabytes or thereabouts of storage, plus the availability of the 96K PET later this year, Commodore will have a computer worth running multi-user systems on.

True, the 6502 processor is likely to run out of steam before that happens: so the likely solution will be a 1980s-style hybrid, with re-entrant and re-useable programs on a large central disk to allow multiple users to get at and run the same copy of the program – perhaps by bringing into their own PET just the chunk of program they need at the time.

Watch Davidson-Richards for that one: we hear they are working on multi-threaded BASIC, which to us means real transaction processing on a shared single copy of the program Reportedly beavering away on the project is the ubiquitous Pete Dowson, who is responsible for Wordcraft and most of the PET comms software on offer in the U.K. today.

MULTIPLE PETS AT MINIMUM COST

THE PRODUCTS

KOBRA MICROSYSTEMS – MUPET

The whole appeal of Mupet lies in its simplicity. It was designed as a plug-in-and-go solution to multi-PET resource-sharing, and by comparison with its all-British rival, MPS, it needs very little participation from the user.

Mupet's Canadian developer is a company called BMB Compuscience which is related to that country's largest PET dealer. BMB turned up at the PET Show last summer on the lookout for a U.K. distributor, and by all accounts were beseiged with offers. They liked the look of Adda Computers, an up-and-coming distributor with some clever ideas on marketing: Adda got the sole dealership for the British Isles and set up a subsidiary called Kobra to handle it.

Sales got under way in September. In that short time Kobra has shipped over 80 systems, mostly via dealers and mostly to education – Mupet was originally developed for Sheridan College, a large Canadian user of PETs, both for teaching and administration.

Mupet will run up to 10 PETs. The limitation is simply signal decay: BMB recommends a total cable of no more than 60ft per system, and Kobra supplies 6ft lengths as standard.

What it consists of

Mupet comprises a master control box, co-ax connections to disk and/or printer, and a ribbon cable running into and out of the interface units that plug into the IEEE port of each PET in the network. The Mupet connector on the last PET in the chain just has a terminator on its 'out' socket.

The connections are extremely neat and very solid, moulded interface units that slot straight into the IEEE port – and they have little legs that ensure they're at the right height for the connection, so the plug is not likely to work its way out. At the other end are two sockets marked 'IN' and 'OUT' for the ribbon cable.

The control box has a built-in power supply for the network and an IEEE interface to which disk(s) and printer are connected in the usual way. LEDs are provided for BUSY (red) and READY (green) to indicate the state of the bus – red means one of the participating PETs is using it, which effectively locks out anyone else until its activity is finished.

At startup any of the PETs can get at the shared disk – provided it's been initialised by one of the users. No special commands are required: the programmer (and the PET) treats the system as if the disk was connected directly to a sole PET.

Queuing up

What happens is that the controller decides who gets at the disk (on a first-come first-served basis). If the bus is busy, the controller automatically queues all request for disk access, so if you try to get at a file while someone else has the disk, you'll experience a delayed response until the preceding PET has completed data transfer. Once the disk is available the Mupet controller will automatically connect the next PET that has requested it: no additional operator commands are required.

It's worth noting how this is done. An I/O message goes out on the IEEE port of your PET, and Mupet intercepts it instantly – so you'll never get a DEVICE NOT PRESENT error. You can, however, pick up that condition by testing ST: the status word is set to -128 if you don't have the required device there.

Having done the handshaking Mupet checks for activity on bus and displays SEARCHING on your screen if there is an existing transfer. As soon as possible the PET command is passed to the controller and then on to the disk to be executed. Completion automatically releases the bus again for the next access request in the FIFO queue: since the bus is busy only when data is being transferred, delays will normally be brief. Only with a massive sequential read, say, will one PET hog the disk for long periods.

On the other hand, when a printer is connected to the standard system it also shares the IEEE bus – so no PET can get at the disk while printing is going on. It was possible for a print job to dominate the bus for quite a while – especially with the slow word processing printers. So BMB developed what everyone is calling the Double Mupet.

Double Mupet

This is a £210 alternative connector which plugs into the IEEE port *and* the user port. On the other side, as well as the ribbon cable sockets it has an extra IEEE port into which you can plug a printer.

This extra module is supplied with special spooling software. The PET to which it is attached can then access the disk and a shared printer: or alternatively, it can be dedicated to the control of its own printer activity. In that case the spooling program looks at the disk at regular intervals to find data files which have been flagged for printing. Those it prints on the printer attached to its own module. While printing it does not occupy the Mupet controller unit, so other PETs can continue to access the disk. Once printed, a file can be either retained or scratched from the disk.

In fact, that extra port and its controller could run any IEEE device: but printing is the obvious use. Both WORDPRO and WORDCRAFT can spool print files now.

The drawback of this solution is quite minor – you might lose the use of a PET for a while. But since printing cannot be a background activity on the PET, you'd be losing PET availability in any case. At least with spooling you can mark files or documents to be output – and actually do the work at a sensible time, when things are quiet on the system.

Mupet will work with any combination of Commodore computer and disk so long as the individual units are compatible – so an 8032 and a 4032 could share a 4040 disk unit, for instance. The 8050 disk has also been proved. It will run with BASIC, Pascal or Assembler and uses standard DOS commands that require no changes at all to application programs – provided that program is to be used through Mupet as if it were the only user of the disk.

Bear traps

That's the normal mode of operation. Caution is, however, necessary when selecting or developing packages to be used simultaneously from a number of PETs. For example, sequential files can give unexpected results when not closed after each access: if you're reading from the disk and another PET gets in between accesses to read the same file, the next sequential read from your PET will not recommence from the record you expected.

Things can also get tricky when using random files. If the same record is updated simultaneously on more than one PET, the last one written back will be taken as correct – although no record will actually be correct.

Similarly, if indices for random files are held in RAM, record additions or deletions will *not,* of course, be reflected in each PET: and when ending the program the last index written back to the disk will be assumed by the system to be the right one.

There are solutions to both hitches, of course – secondary addressing is the usual way around them.

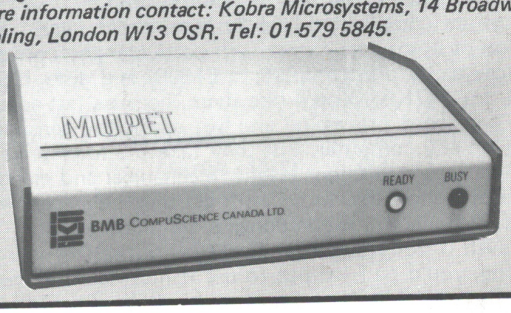
Conclusion

The standard Mupet system consists of one controller, power supply, three Mupet connector modules, and three 6ft ribbon cables with edge connectors. The price for the standard system is £595 plus VAT. Each additional module is £125, including 6' of cable. A 90-day warranty is standard.

What you're principally buying for that is operational simplicity, and of course, that's a strength and a weakness. The system is largely automatic: quick to set up, it probably needs no alteration to your existing software and uses no special commands. The two functional objections can be answered – delays caused by printing can be alleviated now by spooling and the double Mupet, and the potentially more serious difficulty of record pointers and multiple-user updating in files can be bypassed by using techniques like secondary addressing and speedy reads. Both represent workable solutions.

The other major plus for Mupet must be its construction – it looks and feels neat and solid, there's much evidence of thought in its design.

For more information contact: Kobra Microsystems, 14 Broadway, West Ealing, London W13 OSR. Tel: 01-579 5845.



STOP PRESS

After criticism of untidy cabling on their Multi-PET System, Taylor-Wilson are introducing twisted pair cable for all data and handshake lines. According to Sandy Livingstone this permits extentions of up to 100m length. Not a single error was detected during tests, he said. The bad news is that the cost of the cable has resulted in a price increase to £680 for a 3-PET system. However, this does include every cable.

MULTIPLE PETS AT MINIMUM COST

TAYLOR–WILSON SYSTEMS – MPS

Taylor-Wilson was early into the field with MPS, but it took the arrival of the Canadian competitor to stimulate some of the product development that resulted in what is now a much improved and much more useable offering. MPS still receives little general promotion, though: Mupet's marketing is far better.

Sandy Livingstone, who fathered MPS, says he had 50 MPS systems "of various configurations" running live by Christmas. Nearly all are in educational establishments, one of Taylor-Wilson's speciality sales areas, but also an obvious candidate and early taker for any multi-user PET system.

"We're in the business of selling" says Sandy: "We're not proud." When Mupet appeared it showed him just how clumsy MPS was at the time: indeed, there are unconfirmed reports that Taylor-Wilson pitched for the Mupet agency – and might just have dropped Sandy's baby if BMB had taken to the Solihull supplier. As it was, MPS got a facelift after the PET Show last summer.

How it works

The principal of MPS is that multiple PETs (up to eight, typically three or four) are connected to a common pair of wires, one for data and one for control. Also connected are any other addressable IEEE devices: disks are the likely choice, but printers are also prime candidates – or plotters, or monitors, or whatever.

The connection to the PET is made via a relay box, one per PET. So each box is plugged on to the control line and the data line that connects all the boxes and all the devices: going to its PET each box has one cable to the user port (that's for the control line) and one for the IEEE port (for data).

In fact, the control line/user port connection isn't mandatory. The boxes have on them a switch: in the MANUAL position this gives you total 100-per-cent use of the IEEE data bus – providing no-one is using it at the time. When you switch to MANUAL the box checks the control line to see whether you can have the bus: if you can, you get a green light and it's yours. Typically you'd use it to grab the disk and do some reading or writing. If it's busy and someone else has the bus, you get a flashing red LED.

When you've got the disk it works exactly as if it is connected directly to your IEEE port. And when you've finished using it, flick the switch to PROGRAM and someone else can have a go. Typically you'd go to MANUAL to load a program, switch to PROGRAM while you run it, and maybe go back to MANUAL to store some results or amend files.

Using the system

The user port connection is there to automate the bus access. At the start of the day you'd use the MANUAL switch to read from the disk a little 250-byte program called MPS1. You load and run it: this effectively gives you two extra BASIC commands, BOPEN and BCLOSE, which you use to get at the bus. BOPEN checks for activity on the control bus: and if you can have it, it's yours until you BCLOSE the connection.

You can obviously incorporate the open/close procedure into a program. Existing BASIC programs shouldn't be hard to modify. Proprietory software will need the author's help, but as Taylor-Wilson points out, this will usually be forthcoming, since any new operating environment means new markets for the software. WORDCRAFT for one has been modified so that it actually offers you the chance right at the start to say whether you're an MPS user – and it assumes that you might be one PET in a multi-user system sharing box disks and daisywheel printer.

All this is a major improvement on the somewhat leaden Mark One version of MPS, which had you using address POKEs and SYS subroutines with the original MPS1 residing in the second cassette buffer. All very inelegant.

What about contentions? If another PET is using the disk when you attempt to access it, MPS1 will flash a WAITING message. When the disk is free for your use MPS1 will connect you to it and inhibit all other access until you use BCLOSE to release the disk.

If several PETs try to get the bus at the same time, what happens is that access is denied to everyone and you all have to try again – until someone beats the rest.

MPS or Mupet?

The chief constrast with Mupet is that MPS leaves system control firmly in the hands of the individual PET user. In other words, Mupet's black box handles all the disk accessing automatically: you as a user on any of the daisychained PETs would just treat the disk as if it were connected conventionally to your machine alone. The Mupet controller handles automatically all contentions and priorities for disk access. One big advantage of MPS is obviously that you can lock out all other users to grab the disk for as long as you need it. That's also the chief disadvantage, though, since it puts the onus on the user to control the network. Mupet does it all automatically, deciding who gets the disk and when: and no alteration at all is needed to existing programs.

An effect of this is that you have to be somewhat circumspect in your programming if you aren't to tie up the network for too long. For example, if you have a printer being shared, it makes sense to get one with a large input buffer – otherwise your data will be backed up down the line, denying access to everyone while the mechanical marvel chunters away one character at a time and only 30 of them per second.

An alternative is the technique Pete Dowson and Mike Lake apparently used in modifying WORDCRAFT – you put a BCLOSE at the end of each print line and BOPEN at the start of the next, so the bus is freed briefly after one line print to let someone else get on.

That's hardly a massive drawback but it does involve some effort. So does the start-of-day routine, loading MPS1 and setting up individual device addresses. The physical appearance is similarly on the artless side, with quite a lot of cabling on view.

Conclusion

In short, Mupet is simpler in use. But MPS does have some major advantages. For a start, it's *conceptually* quite simple. You could always have local devices as well as shared devices, like a cheap matrix printer on your PET for draft work and an expensive daisy-wheel printer being shared for the top-quality printing: Mupet has only just come up with a solution to that one.

More important, you can have as many shared devices on the net as you like, subject only to the laws of physics and the number of different device addresses you can allocate: "It's very easy to tag on anything you like."

There is also one not insignificant advantage for MPS in that it only needs one power supply per network. This is a 9V supply built into a 13 amp plug, and it actually powers all the relay boxes via the control line.

MPS also seems to have an edge in relatively complex usages, especially for file addressing. Using Mupet on a sequential file the record pointer will normally be wherever the last user left it: so you might need to set up a lot of secondary addresses for different users to get at the same file. That problem doesn't occur with MPS.

Taylor-Wilson quotes £825 for a four-PET MPS system. That includes all cabling, the power supply, an impressive two-year guarantee, and a tutorial/demo disk.

For more information contact: Taylor-Wilson Systems Ltd., Oakfield House, Station Road, Dorridge, Solihull, West Midlands. Tel: (05645) 6192.

ZYNAR – CLUSTER/ONE

The Cluster/One 'disk sharing system' comes from Harry Sahl's Nestar Systems. He was responsible for the Programmer's Toolkit, which is a fair pedigree: he's now tied up in this country with a newish Rank subsidiary known as Zynar, headed by a luminary of the micro world called Colin Crook – Crook's background includes designing the Motorola M68000, so he's no mug either.

Zynar and Nestar are working on a variety of 'silicon systems' projects, which basically means their own software firmware as applied to novel combinations of off-the-shelf hardware. The immediate product is Nestar's Cluster/One Model A, a high-class networking system that links up to 65 Apple IIs to up to 33 megabytes of disk storage.

This developed from an original suffix-less Cluster/One, and that rather less powerful system is still available for the PET. Though neither Nestar nor Zynar as actively promoting it, Cluster/One is available here on demand and would be supported.

It involves a different order of complexity – and of cost. "Price on application" said Ian Powers at Zynar: in the States that seems to mean around $100 to $150 per user plus $5,300 for the "Queen" (an 8K PET which does nothing but control access to the disks) and the disk drives themselves (usually a pair of 630KB full-size double-sided floppies).

Controlling the Network

You have to buy the Queen-plus-disks combo from Nestar/Zynar, because there's a lot of network control being done in them – and besides you can mix PETs, TRS-80s and Apples on the same system, up to 30 separate computers in theory. Neat, huh?

The personal computers are called 'Drones', though Nestar's current bout of self-examination and market positioning seems to be dropping graphic images in favour of duller epithets like 'client stations' for the user systems and 'servers' for the device controllers.

A key feature of Cluster/One is its very own Disk Operating System, which runs in the PET that controls disk access. This gives

MULTIPLE PETS AT MINIMUM COST

you simple and familiar commands like LOAD, SAVE, RUN, DIR. – though prefixed with an ampersand to identify them.

The DOS queues disk access requests, so there should be no significant delays. Along with the logic in the Interface units – PCBs for the PETs and Apples, a separate box for the TRS-80 – the DOS does a good deal of checking on data transfers: there's automatic retransmission on errors, naturally. The DOS gives you a lot of CP/M-like commands to check over all or some of the disk DIRectory, plus the ability to set up and maintain your very own privileged-access files on the shared disk.

Another good DOS feature is a fully-spooled printer support system. Any printer output generated by a user workstation is first written to the disk storage and printed out on the shared central printer as soon as it is available so users don't have to wait until their output is ready before going on with further work.

On the debit side

There are a few drawbacks to Cluster/One. For a start, there's the price – but then it's a somewhat different market by contrast with the Mupet/MPS menus. Cluster/One was originally developed for US educational establishments, the kind of place that already has a mix of micros, and is presented enthusiastically as a cost-effective alternative to a minicomputer timesharing system – so for that matter is the even more impresssive Apples-only Model A version. By comparison with a mini solution, Cluster/One probably loses out on the speed with which it shifts data around: but with its DOS it can cover all the functions and all the operations of time-sharing (short of re-entrant code, which isn't available on all minis anyhow) with the major advantage that there is no sharing of the actual processing part of the computer system.

Other criticisms reported by our US contacts look minor. Every user has to sign on at the start of the day, a single-line command that could perhaps have been done automatically or centrally. Cluster/One uses only the Microsoft BASIC, so if you insist on using Apple's awful Integer BASIC or TRS-80 Level I BASIC you won't be able to get on to the system – all PETs are OK, though.

Apart from that, there's no major and irreparable flaw in Cluster/One – except that it seems to have a back seat now at Nestar. But if you've the yen to mix microcomputer systems on one network, you'll find that this is the only alternative to CP/Net.

For further information contact Zynar Ltd., 122-123 High Street, Uxbridge, Middlesex. Telephone (0895) 59831.

MUPET IN ACTION

To see how a multi-user PET network works in practice, we asked a couple of Mupet users to describe their experiences.

The original idea for a Computer Centre at Cheltenham Ladies College involved buying equipment for three functions – demonstration, practice and assessment. In addition the College wanted facilities for research and development in educational applications of microcomputers. The budget was limited and the top priority was to be given to the provision of hands-on experience: stand-alone PETs were to have priority over printers and disk drives. On the other hand, there was an unavoidable requirement for hard copy for external examiners.

Originally those functions were to be provided by three separate systems. One PET with a TV interface for a studio monitor would provide demonstrations: four stand-alone PETs would provide hands-on practice: the assessment function was to be met by one PET with a disk drive and printer.

Pupils would be saving programs on tape (all PETs had a cassette unit) and this would be converted to hard copy by staff on the assessment system – a cheap arrangement but one which turned out to be tediously slow and wasteful of staff time: "It would have been quite incapable of coping with our instructional load without our employing a fulltime assistant," says Major Hardie, in charge of computing at the College. "However," he adds, "The gods were kind to us: Commodore reduced their prices and the Mupet system was introduced from Canada."

He now combines all three functions in the one system. This consists of five PETs linked to a disk drive and printer by a Mupet, one of the PETs having the TV monitor interfaced to its No. 1 cassette port.

The program library has been transferred to disk and loading is rapid. Pupils can save their developing programs on disk and obtain hard copy from the printer, which means they can debug in their own time and take the old version off disk for amendment in a matter of seconds. "We can timetable a group of pupils for single periods separated by days without losing continuity."

700% Faster

Cheltenham demonstrated the success of Mupet when it used the system to process masses of statistical data from a national survey. "In two days we inputted and collated two hundred 25x10 matrices. Had we not had the Mupet it would have taken us two weeks!"

Work on this survey has directed the College's attention to Mupet's potential in the setting up of a large data base. "Up till now we have been daunted by the magnitude of the task of typing in large masses of data: with our Mupet systems this task would be reduced by a factor of five."

"We are also investigating the possibility of implementing a Mupet word processing facility. We have a Wordpro III system separate from the Mupet and can see little difficulty in incorporating this or a similar system into the latter. We do not see it replacing a typing pool: but it would be admirable for teaching word processing."

Five different teachers use this system, sometimes taking over from one another in the three minutes allocated to a period change. It was therefore necessary to lay down strict operating instructions on powering up and shutting down, diagnostic routines, crash procedures, allocation of file numbers and so on. "In this we have tended to err on the side of rigidity. But that is no bad thing in an educational establishment where we try to introduce the disciplined atmosphere of the workplace."

Very Pleased

Major Hardie says he's "very pleased" with the way Mupet is working – though "we have yet to use the system for random access files. We can see snags in doing this with a large number of PETs." Still, "Had we gone for a Research Machines 380Z solution we would only have a 'Preliminary Specification for a Proposed Multi-User System' instead of one that works!"

Much the same message comes from David Parkinson, Head of Physics and Computing Science for Modern Tutorial College in Kilburn Lane, West London. The College offers courses in computer science and David has developed several computer-aided learning systems for PETs: it was the requirement for several students to access the disk that prompted him to look at Mupet.

"We had been using two PETs wired to one disk and using a verbal protocol, but due to the length of the cable, this was not very practical. More seriously, there is a 'funny' in the PET – when you scroll the screen there is a quick tremble in the bus. We've a special code for blanking out the screen; but if I'm talking to the disk and someone else who is holding the same disk just scrolls their screen I lose everything. This problem, together with the fact that we increasingly needed to pull frames down from the disk, led us to Mupet."

On the practicalities of installing Mupet David is pretty sanguine: "That's a hard one, it only took us two minutes! Using the diagram supplied we just plugged in the Mupet boxes to the back of the PETs and the green light was on and ready to go. From then on you can forget about Mupet – it just sits there on the bus making everyone take their turn."

Problems

He's had only two problems since. The (British-made) power supply blew after about a week. "At the moment it's running quite happily off a 9v battery but I can easily solve this by buying a new transformer." There's a 90-day replacement warranty, anyhow. The other problem is more serious – if too many commands are given too quickly then the system crashes, particularly if in 'copy disk' mode. "We do not actually lose any data; but it is very frustrating – when it occurs I have to reload the disks and re-key any current data. If this was a serious problem, we'd be screaming blue murder, but most of the work we do is very straightforward and the problem doesn't arise."

Kobra, incidentally, believes the crashing is due to a PET DOS error. Comments Kobra's MD, David Whitehead: "We've 80 systems in the field but this is the first time I've ever heard of this problem. Our own programmers have, however, experienced 'copy disk' problems on stand-alone PET systems." *PRINTOUT* readers should watch this space for the final outcome.

David Parkinson has come across the multiple field access problems we've noted. But those problems are by no means peculiar to Mupet and will be familiar to any programmer who has developed software for a multi-user environment: Mupet's availability will, we are sure, encourage development of true multi-user software.

He likes Mupet and isn't at all chary about recommending the system. "Sharing disks is a splendid idea and economically it is very sound. I have studied some of the mainframe computer-aided learning techniques in America and it all looks very expensive: but the existence of Mupet means that without spending a ludicrous amount of money a reasonable program of computer-aided learning can become a practical thing. I think that with Mupet we have the equivalent of a minicomputer time sharing system – but one that makes sense on micros. The potential is tremendous."

THE PET™ REVEALED

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An overall view — The accumulator and arithmetic unit — Processor status register and flags — Branching and Jumps — Addressing modes — The Index register — The Stack register — Interrupts — Data modify instructions — Machine code on the PET — Hand assembling programs.

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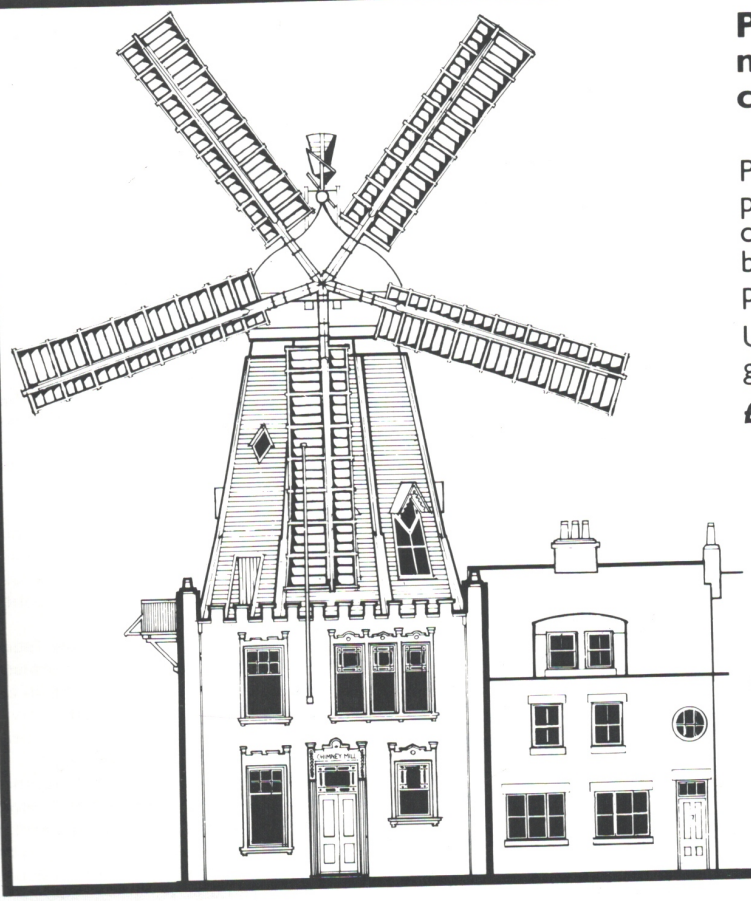

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TOMMY'S TIPS

Cassette Files

What's caused more PET owners to tear out more hair than anything else in the manual (or, indeed, omitted from it)? There can only be one answer. Cassette Files.

Properly used, PET's tape filing system can be quite efficient. So what follows is a valiant attempt to throw light upon this tenebrious subject. We kick off with a note on the use of tape drives 1 and 2 for the writing of data files.

OPEN1,1,1

The first 1 is the command to open file number 1. You will be sure to use the first 1 everytime you issue a PRINT# or INPUT# command? Like so: PRINT#1. The penalty for failure is the dreaded FILE NOT OPEN ERROR.

The second 1 in OPEN1,1,1 refers to the device number. In this case we are trying to attract the attention of tape drive No.1. To address the second cassette drive, you would naturally say OPEN 1,2,1. Simple really. No wonder they talk about logical files.

Now here comes the clever bit. The third number in the command refers to the type of operation you want the computer to carry out. It is what they call the secondary address. In the example I gave, the third number was a 1, which is shorthand for "open file to print to tape and leave an End-of-File marker".

Equally, I could have put a 0 in to signal "open for a READ", or even a 2, which would mean "open for PRINT but leave an End-Of-Tape marker as well as an End-Of-File marker on the tape".

When the PET runs over an End-Of-Tape marker, it generates a FILE NOT FOUND error, which is more useful than ploughing on through miles of blank tape.

Having OPENed our file, and carried out whatever operations we had in mind, naturally we will need to close it again. If you have ever tried to open the second drawer of a filing cabinet while the top one was open, you will have an approximate idea of why CLOSE is necessary. All you need to do is repeat the first digit of the OPEN statement (the file number, remember?), like this: CLOSE 1.

The PRINT# statement allows strings of characters — all right, words — or numbers to be printed. The maximum length of a string to be printed out is 80 characters, if it's your intention to read 'em back again with the INPUT# statement. If, like me, you are a bit verbose, you can use the GET# statement to retrieve strings of up to 255 characters in length.

A word of warning. If you do intend to use INPUT# to read data back, you must not include any cursor control characters. INPUT# is extremely prejudiced against them.

GET# allows you to read one character at a time from a data file, and build up long input strings. It is also much more broadminded about cursor control character.

Take a close look at the three following routines which show how all this works in practice.

```
10 REM STORAGE AND RETRIEVAL OF DATA
20 REM & HOW TO USE THE PRINT#1
40 DIM A$(200)
50 PRINT"ENTER NAMES TYPE -999 TO TERMINATE
60 PRINT"ENTRIES
70 FORX=1TO200
80 INPUT"ENTER NAME -999 TO END";A$(X)
90 IFA$(X)="-999"THEN120
95 REM USE "-999" AS END OF FILE MARKER
100 NEXTX
110 REM FILE SYSTEM FOR PRINT STARTS HERE
120 PRINT"▮ENTER A BLANK TAPE THEN PRESS RETURN
130 GETA$:IFA$<>CHR$(13)THEN130
140 OPEN1,1,1
150 FORI=1TOX
160 PRINT#1,A$(I)
170 NEXTI
180 CLOSE1
```

```
10 REM STORAGE AND RETRIEVAL OF DATA
20 REM & HOW TO USE THE INPUT#1
40 DIM A$(200)
70 FORX=1TO200
110 REM FILE SYSTEM FOR INPUT STARTS HERE
120 PRINT"▮ENTER DATA TAPE THEN PRESS RETURN
130 GETA$:IFA$<>CHR$(13)THEN130
135 REM -999 IS BEEN USED AS AN END OF FILE MARKER
140 OPEN1,1,0:PRINT"FILE OPENED"
150 FORX=1TO200
160 INPUT#1,A$(X):IFA$(X)="-999"THEN180
170 NEXTX
180 X=X-1:CLOSE1
190 FORI=1TOX
200 PRINTA$(I),
210 NEXT
```

```
10 REM STORAGE AND RETRIEVAL OF DATA
20 REM & HOW TO USE THE GET#1
40 DIM A$(200)
70 FORX=1TO200
110 REM FILE SYSTEM FOR GET STARTS HERE
120 PRINT"▮ENTER DATA TAPE THEN PRESS RETURN
130 GETA$:IFA$<>CHR$(13)THEN130
135 REM -999 IS BEEN USED AS AN END OF FILE MARKER
140 OPEN1,1,0:PRINT"FILE OPENED"
150 FORX=1TO200
160 GET#1,A$:B$=B$+A$:IFASC(A$)=13THEN180
170 GOTO160
180 A$(X)=B$:B$="":IFLEFT$(A$(X),4)="-999"THEN200
190 NEXTX
200 X=X-1:CLOSE1
210 FORI=1TOX
220 PRINTA$(I)
230 NEXTI
```

Tommy's Dud Program of the Year Award

Spotted any howlers lately? If you have been disappointed by a program you have bought, most of the software publishers will exchange it for something else in their range if the complaint is justified, and you can convince them you haven't copied it. In extremis you should be able to dig a refund out of them. If not, write and tell me.

I would also like you to write to me with your nomination for my Dud Program of the Year award. Only the truly awful need apply. First prize will be a copy of Personal Software's Birth Control program; the runners up will receive two copies .....

Slow POKE

When reversing the screen using a FOR.....NEXT loop

POKE X,ASC(" ") [Shifted space]

produces a Reverse Field approximately 1.4 times faster than

POKE X,160

The same thing happens when the ASC function is used with other characters. Is there a simple explanation for this short cut?

A. Nelson

POKE X,160 is slower because PET takes longer to convert the 160 to floating point binary, than to convert the ASC (" ") to a number to POKE. ASC has the advantage over 160 of being a built-in BASIC function. You get a noticeable improvement by defining a variable for the POKEing routine at the start of a program. Here is an example of what I mean:

10 A = 160

20 POKE X,A

runs faster than

20 POKE X,160

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VICTORY IN VEGAS

Hit of the Consumer Electronics Show in Las Vegas was Commodore's new VIC computer. The announcement of a $299 retail price (£130 approx) provoked consternation from rival manufacturers, and a round of price slashing by Atari, APF and Texas Instruments.

The VIC20 has a full size typewriter keyboard, 5K bytes of Random Access Memory, expandable to 32K, and the capability of accepting plug-in program/memory cartridges. Commodore also announced a range of low cost peripherals including games paddles, a light pen, a serial printer and a single mini-floppy disk drive.

Once plugged into a colour television, the VIC can be used to generate both text and graphics in eight colours, on eight different colour backgrounds. Sound is available via the loudspeaker in the television; the VIC contains 3 tone generators of 3 octaves each plus a sound generator for 'white noise' sound effects.

In addition to the standard upper and lower case alphanumeric characters, the full PET graphics set is implemented. There are also four programmable function keys, which, when shifted allow the user to assign up to a total of 8 BASIC commands or instruction sets to them. A special Control key is used to set character colours. One welcome addition is the inclusion of a £ sign.

Additional facilities available from plug in cartridges include High Resolution Graphics, plotting and additional 'Toolkit'-type programming commands.

The VIC was demonstrated accessing United Press International's public database, using the Source micronetwork. This involved an inexpensive modem and a ten-line program to convert PET ASCII codes to standard ASCII and activate the RS232C port. The VIC is the most inexpensive means of accessing micronetworks to date.

A special supplement on the VIC appears in the next issue.

FANTASTIC VOYAGE

starring Jim Butterfield in a foggy tour of VIC's innards.

VIC hasn't completely settled into its final form yet (the backroom boys are still scrambling to put the finishing touches on). It's probably too early to talk about the inner architecture at this stage. And yet.....I hate to see Julian Allason sloshing around in there, without so much as a paddle* (see *PRINTOUT*, March 1981, p.17).

For those who know a bit about the PET/CBM innards, I'll take a quick pass through the VIC and point out familiar landmarks that have shifted a bit. Just about everything you knew from PET is still there in the VIC, plus extra things.

If you don't know too much about PET/CBM internal workings, the following may not be too much help to you. Keep in mind, however, that you can always resort to nodding your head wisely during technical discussions.

The first thousand locations in VIC are business as usual. Commodore have once again done their Incredible Zero Page Juggling act so that anyone who has managed to memorise the important POKEs won't get into a rut: you'll have to memorise a fresh batch. Hot flash: due to a possible oversight, four locations (0,1,2 and 213) are unchanged from Upgrade and 4.0 PET/CBM ROM systems. Too late now for Commodore to move these, so we're left with only 252 locations to hunt for.

Page One

As we proceed from page zero to page one we enter the 6502 stack area. Usage here hasn't changed. Floating point to ASCII conversions are staged at the lower addresses, and tape errors are logged in the same area. Galloping up to the top of the stack, we find that Commodore have notched away a few locations at the very top, and things are generally done the same way as for PET/CBM.

Page 2 starts out with a mild change. VIC allows 88-character lines, as opposed to 80 on the PET/CBM. So.....the Basic Input buffer is 8 characters longer, and everything following (file tables, keyboard buffer) has to move over. Late in page 2, we encounter some new things, unique to the VIC. Some of these are related to new VIC functions, such as colour or sound. Others look like clever little Commodore goodies. For example, VIC has auto-repeating cursor movement keys; but poking location 650 decimal with a value of 128 suddenly makes all keys auto-repeating.

There's only one cassette unit, so we don't need two cassette buffers. This leaves us lots of space in page three, and Commodore has filled up the first part with addresses which might be called links or vectors. Almost everything interesting the VIC does starts out by hopping through one of these address links. If you have the destructive tendencies of the average machine language programmer, you'll want to change these links so that VIC will come to your routines rather than proceeding sensibly through its own programs.

That Gap

The cassette buffer is near the end of page three. After page three, we have a gap: memory doesn't continue right into Basic as with the PET. Instead, Basic memory starts at hexadecimal 1000, or decimal 4096. This appears at first glance to be a major Ooops, since it seems to imply that PET programs can't be loaded into a VIC — they would go to the wrong place. The tape loader automatically relocates the Basic program as it loads into the VIC. Now all you have to do is to find programs that will work decently in a 22-column output environment. And that don't use POKEs, PEEKs, or WAITs or any machine language. Keep in mind, of course, that programs saved on a VIC won't relocate by themselves if you try to load them into a PET.

A chunk is taken away from the top of memory to be used as screen memory. This isn't wired into a fixed address, as with the PET. 22 columns times 23 lines gives 506 locations needed for the screen — in fact 512 locations are trimmed away. Just so that you'll feel properly challenged, the screen does not stay at the top of memory if you add extra RAM. So watch where you're POKEing.

Now — if you find where the screen is this time, you would think that you could just POKE a character there, right? Of course. You might be troubled by the small detail that the character will come up in the same colour as the background. Translation: it's invisible. Try explaining to your friends that it's really there on the screen. Write down their comments and send them in as entries to Gavin Sanders' insult-of-the-month department.

No problem to the resourceful programmer. He discovers that he can POKE a different set of locations to set the background colour of a character. It's called the Color Nybble location (American spelling) and of course there's one location for each character position on the screen. These locations start at hexadecimal 9600 or decimal 38400. Rumour has it that they too move if you add extra RAM.

It seems that there's no problem adding extra memory up to a full 32K, since nothing uses memory space before hexadecimal 9000. At that point, we have all of our interfaces: the VIC chip itself (yes, VIC is also a chip), and the usual clutch of timers, input/output ports, interrupt lines and so on. The VIC keyboard follows the matrix pattern similar to that of the PET/CBM.

Ports of Call

While we're passing the Input/Output ports, we should observe that the IEEE-488 bus is almost still there. The whole collection of procedures — secondary addresses, ATN signals, etc., are still in place. The difference is this: the bus has gone serial, so that the bits stream out one behind the other; and they seem to be controlled by clocking, not by handshakes. There are less wires, so you can't call it an IEEE bus any more; but you'll recognise the style.

There's another new type of input/output channel in place which seems to be called RS-232. The proper name should be "buffered serial interface"; it's designed to allow a considerable number of characters to be backed up waiting for transmission or reception.

Addresses from hexadecimal A000 to BFFF are reserved for ROM plug-ins. If you plug in such, this ROM will "take over" the PET and if it wishes it can lock out the main VIC ROMs.

Finally, hexadecimal addresses C000 to FFFF are the working ROMs, with Basic and supporting systems. There is no Machine Language Monitor built in; I hear that it will be available on a plug-in ROM. I wonder: with a screen only 22 columns wide, what will a hex dump look like?

If you managed to last through the above tour, you may have noticed that many things have moved, but few have changed from the PET/CBM. The VIC still belongs in the family. This is very noticeable in Basic: everything has been retained, even the trigonometric and EXP/LOG functions, and there are no new Basic commands. The new features are implemented with POKEs or new pseudo-cursor movements.

Once you get your compass and road map, you'll be at home with the VIC.

**From his camp upriver, Julian Allason cables: "ALWAYS HAPPY TO DEFER TO SUPERIOR WISDOM OF GREAT TURKEY OF SILICON VALLEY STOP MY PIECE PREPARED DURING COMMODORE NEWS BLACKOUT AND CLEARLY LABELLED SPECULATIVE STOP SEND MORE MONEY AND NEW PEDDLE URGENTMOST.*

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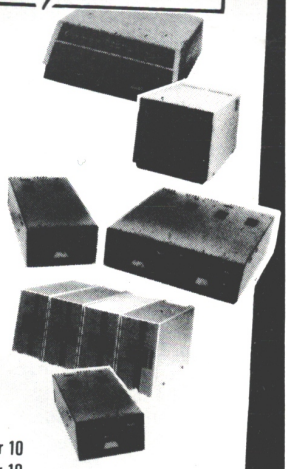

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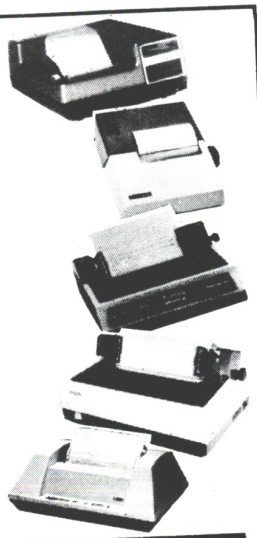

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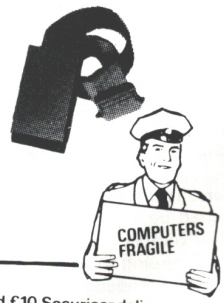

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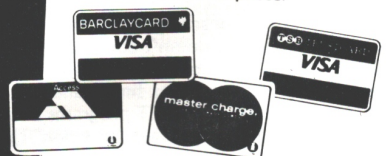

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THE GREAT COMPUTER QUIZ

Ray West invites you to try your hand.

The following quiz is based mostly on the standard 'new ROM' PET with 40 column screen. Occasional references to peripherals may include, among others, CompuThink disk units and Qume printers: because I'm used to them. No prizes offered for correct solutions — merely the feeling of being in the very forefront of computer expertise! There are 11 questions, of varying difficulty and rigour, which are not intended to be in any particular order. It is possible, *(but very unlikely! — Ed)* that when you check some of the code on a PET, printers' errors may have crept in, in which case you'll have the extra task of attempting to deduce the correct question too! The very last question is specific to CompuThink; people not familiar with this equipment may find it a little hard, therefore.

The solutions are cunningly concealed elsewhere in the magazine. See page 39.

1. What does the following short piece of BASIC do?
```
6260 L1=VAL(DD$):L2=VAL(DM$):L3=VAL(DY$):
OK =-1 AND L3>79 AND L3< 89 AND L2>0 AND
L2<13
6270 OK = OK AND L1>0 AND L1<32+(L=40RL=
60RL=90RL=11)+(L=2)*(3+(INT(L3/4)*4=L3))
```

2. When in lowercase mode — i.e. with both upper and lower case available on the screen — an experimentally-minded programmer - who we'll call Les for short, enters the following line:
```
1000 rem Load new data track from here
```
Les is aware that REM statements sometimes attract peculiar treatment from the computer and just to check, lists the program as it now stands. Can you tell what he will find?

3. The following fragments of BASIC all have one thing in common on the PET. Do you know what it is?
```
.55+.32=.87
3/5*5=3
.01+.05=.06
```

4. I feel sure the great majority of readers will know what a POKE is. A special POKE, which speeds up printing to screen and functions like LIST, was quite recently published to a delighted world. Can you remember what it is, and what is its connection with the new 80-column PET (and some others?)

5. Here is a very small piece of BASIC code, a short loop which prints out the value of its loop variable. It looks at first sight to be a fairly simple piece of programming. But can you work out, before running it, what values it will print? They will, of course, vary the initial value of J:
```
FOR J = J TO 100: J = SQR(J): PRINT J;: NEXT
```

6. STR$(A), as you no doubt know, converts a floating point number into a string, which may contain E and other possibly unwanted symbols. At any rate, the numeral becomes handily manipulable. The question is: what (slightly) odd feature does PET's implementation of this function have. It is not present on the Apple, for example.

7. Somewhere, dotted about in our friend Les' program, are data statements, containing numerals waiting to be READ into ASCII characters, POKEd into memory, and so on. What are the likeliest uses of these figures?
```
13   32   96   27
```

8. To avoid bugs and wrong inputs, many people input data by concatenating single characters. In this way, great control can be exercised over the permitted input. Example:
```
5 GET X$: IF X$ = " " THEN 5
6 PRINT X$;
7 IF ASC(X$) = 13 THEN PRINT "STRING IS
  ";I$ : END
8 I$ = I$ + X$: GOTO 5
```
This is a very skeletal and bare illustration, not very usable in its present form. The question is: how much memory is used by inputting a string of length 20 using our program? This can have relevance in freeing memory or when memory is short.

9. Here is an appendable BASIC routine which modifies a program onto which it is appended, like renumber, except that it isn't a renumber. Use your skill to determine its action!
```
61000 A=1025: B=256: INPUT L,U
61010 FOR R=0 TO 5E4: IF PEEK(A+2)+B*PEEK(A+3)
      <L THEN A=PEEK(A)+B*PEEK(A+1): NEXT
61020 POKE 828,INT(U/B): POKE 829,U-INT(U/B)
     *B: GOTO 61040
61030 B=256: A=PEEK(826)*B +PEEK(827): U=PEEK
      (828)*B + PEEK(829)
61040 IF PEEK (A+2) + B*PEEK(A+3)>U OR PEEK(A)
      + B*PEEK(A+1)=0 THEN END
61050 PRINT "CLR DN DN DN";PEEK(A+2)+B*PEEK
      (A3+):PRINT "GOTO 61030": PRINT " UP UP
       UP UP UP UP UP"
61060 POKE 826,INT(A/B): POKE 827,A-INT(A/B)
     *B: POKE 158,2:POKE 623,13:POKE 624,13
61070 END
```

10. And now, if you're still reading, a short final question. A programmer wants, in order to format his output properly, to remove one leading space from a string. He writes, or rather types:
```
555 J$ = RIGHT$(J$,LEN(J$)-1)
```
Can you improve on this?

11. The CompuThink disk operating system adds 10 or so commands to PETs BASIC. One of these is $G. On entry of this laconic instruction, machine code is executed starting at the point from which it was loaded. In other words, when machine code is loaded from a diskette, this instruction runs it, assuming that the entry point is at the very first byte. At least, this is what the manual says. In practice, strange things happen. Why?

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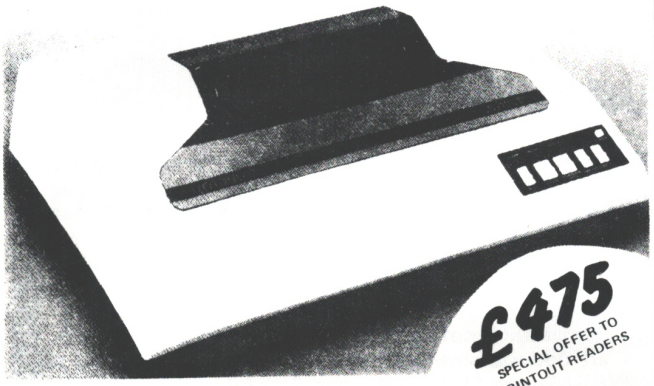

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HOW TO BUY A COMPUTER

Continued from page 25

Copy Everything

The data used by a microcomputer system is nowadays almost invariably stored on floppy disks. These are really quite fragile, and always seem to be falling into teapots or under people's feet. The actual cost of a disk is fairly small, around £35 per box of 10 for a good brand; the data they hold is priceless. A very good rule is that whenever you alter the data on a diskette, *copy it.* Always keep three or four generations of data disks, then if one becomes corrupt, you have only lost a day or two's work. After all, what is a box of diskettes against the cost of having to key in a month's work again? It is also worth asking your friendly insurance salesman to have the data insured, although some companies have had such disastrous experiences that they may be reluctant to do so.

One last point aimed at the user who has just bought a new system, been trained in the mysteries of its use, and having said goodbye to the training girl, is looking forward to a prosperous future. Be Careful. Do Not Be Over-Optimistic. Do Not Put All Your Eggs In One Basket. Keep on your existing manual system until you are convinced that the new one is working perfectly. For example, if you have installed a monthly payroll system, you should 'parallel run' for at least two months, carefully checking the two sets of figures.

There will be those in the industry who will read this and throw up their hands in horror, muttering about 'alarmism' and 'exaggeration'. Yet I have made all these points to disgruntled users over the years, and invariably drawn the reply: "I wish someone had told me that before I started." Well, now I have.

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COMPUTER QUIZ

FAIRLY COMPLETE ANSWERS TO THE QUIZ

1. *This is, of course, a date-validation routine, where OK is used as a flag to signal any error. So, on exit from the routine, a programmer can use the delightful construction IF NOT OK THEN..... It is assumed that day, month and year have been input as strings, and temporary values are used to store their numeric equivalents. Leap years are tested for, and most of the eighties are accepted.*

2. *REM statements are actually parsed by the compiler, and upper case letters are treated as tokens, and therefore generally expand out in a collection of BASIC functions and operators. Shift-L is an exception, and manifests itself as a SYNTAX ERROR? message. The listing accordingly simply stops at line 1000 and prints this message.*

3. *The fact that I have in mind about these statements is that they are all false! If the PET computes the truth value of any of these statements or (and which amounts to the same thing) any of them follows IF, and is used as a condition, the undeniably true sums are rated as false. This is a consequence of rounding errors in the very smallest bit of the calculation. I can still remember my feeling of astonishment when I was shown this sort of result.*

4. *POKE 59468,62 is a poke into the mysterious regions of INPUT/OUTPUT and has the effect of greatly speeding up the print-to-screen functions, so that listing and writing on the screen take place at quite a fast rate. However, Jim Butterfield has advised that this may be undesirable with the 8000 machine. Without attempting a Canadian accent on paper, I can quote him as saying: "a curl of smoke will come from the inside ..." He added that he* thought *Commodore would honour the guarantee.*

5. *As long as J is in a suitable range, not negative, and not more than about 99 squared, the loop will run indefinitely, and the printed figures converge to a fixed value. The number is such that it equals the square root of itself +1, and is in fact the so-called 'Golden Section', sometimes called 'Phi'.*

6. *A positive number, or zero, is turned into a string with a leading space.*

7. *The likeliest uses, in the opinion of the panel of experts, are:*
   - *13 Obviously, carriage return*
   - *32 Equally obviously, ASCII for (lower case) space.*
   - *96 Probably RTS in machine code. In Hex it is $60.*
   - *27 Bit less familiar. This is ESCAPE, used to control printer functions.*

8. *Suppose we input ABCDE .... The strings built up, from the top down, in memory look like this: ....ABCDEEABC DDABCCABBAA.*
   Where each X$ takes one byte, and each I$ occupies one more byte than it did previously. A little algebra, to sum the series 1+2+3+ .... gives a general formula of ½n(n+1) bytes for a string of length n. So the answer is 230 bytes.

9. *It is a block delete program, which deletes lines between L (for 'low') and H (for 'high'). It does this by printing the line numbers to be erased directly onto the screen, then forcing these numbers to be incorporated into BASIC by POKEing carriage return characters into the keyboard queue. The numbers are PEEKed from the program; it is far slower to print every single line number between L and U.*

10. *You can use: 555 J$ = MID$(J$,2) instead. Whether this is an improvement, however, may be debatable, since this construction may not run on other BASICs.*

11. *Because there is a bug in CompuThink's system. I imagine this has some connection with the frequently speculated-on reluctance of Americans to use machine code. The error (in locations B53D to B541) occurs because a 'JMP' is loaded into location 27H, but a JSR is then executed to the next location! The part of memory concerned holds BASIC pointers, and it so happens that if the program's length is changed, so also is the machine code which $G finds itself in. In fact, if a program's length is adjusted until PEEK(42) =96, $G simply finds an RTS and returns to BASIC. This may interest people who wish to try CompuThink's protection facility. It won't make a program unlistable, but they'll have to work a bit harder.*

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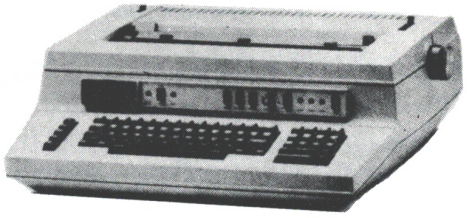

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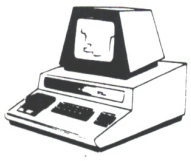

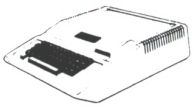

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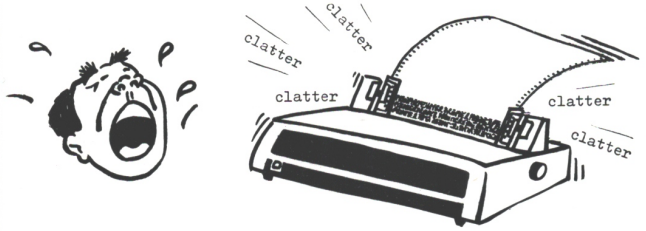

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Adaptive Keyboard Trainer

PROGRAM: Adaptive Keyboard Trainer
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DISTRIBUTED BY: Most PET Dealers or by mail from Audiogenic Ltd.
PRICE: £15.00 inc. VAT
REVIEWER: Ray West

The clumsily entitled Adaptive Keyboard Trainer is title MP095 of Commodore's 'Master Library'. It comes packaged as a cassette and sparsely typed five page manual within a plastic envelope. According to the blurb it "works out and responds to your personal level of skill ..... guarantees you are never stuck at repeating the same old exercises." This overstates the case somewhat, but we think the approach can reasonably be described as "business like."

The program opens with an advertisement for SRD Sales, who presumably wrote it, and an invitation to select 'A' for Alphabetic or 'N' for numeric keyboard exercises. Skill options are chosen by pressing a key from 0 to 9. Next to appear on screen is an excellent representation of the keyboard, beneath which a string of numbers or letters flash up. The aspirant touch typist sits, fingers poised ready to key these in. Failure to do so generates a blob which is replaced by the current letter once the correct key has been struck. The screen keyboard diagram actually prompts the user by highlighting the position of the correct key. It would of course be possible merely to copy the prompted key, but there would be little sense in cheating.

The PETs 'stop' key is disabled at the beginning of the program with a disable routine that relies on the interrupt being redirected. All keystrokes are validated but there doesn't appear to be any means of exiting from the program, short of turning the power off. Pressing the 'shift' and 'E' keys as the manual suggests, doesn't work.

Once thirty two characters have been typed, a new string of characters replaces them on the screen. The strings presented in this way are controlled by your progress, certain of them being very much harder to type than others. Some of these strings consist of sentences ("DID ROD USE..") whilst others are meaningless ("FRDESW) and hence more difficult to type accurately. 48 strings are built into the program, which didn't seem very many to us. The absence of protection in the program means that a user who becomes jaded can change them himself.

The author's enthusiasm also seems to have flagged when it came to testing for use of the Shift key; the program doesn't. This is a curious omission, even if the tutorial is aimed solely at computer hackers, which the documentation suggests it is not.

From time to time the trainee typist is invited to press 'Shift' and the question mark key for a score of the number of correct and incorrect keystrokes, percentage accuracy, and projected typing speed. We were puzzled by some of the timings, which appeared to be inaccurate.

To obtain a balanced evaluation, we consulted a number of trained typists, who confirmed that the method – ignore keyboard, read line, glance at a prompt (usually on a wall) – is standard. They were, however, enthusiastic about the PET method which they felt was an improvement on the normal practice.

Conclusion: A modest program which despite a number of flaws, enables one to acquire an essential skill.

Recommended.

PRO-KIT#1

PROGRAM: PRO–KIT#1
DISTRIBUTOR: Intex Datalog Ltd., Eaglescliffe Industrial Estate, Stockton on Tees, Cleveland
AVAILABILITY: Cassette, CompuThink & CBM disk
PRICE: £40.25
REVIEWER: Tommy Turnbull

This software is intended as a programming aid for the writing of business programs. The question is, how easy is it to use? You would certainly need to be familiar in the operation of the PET and you will have to remember quite a number of SYS codes and POKES to use it. Fortunately the documentation is good. The front cover of the user manual actually lists all the SYS and POKE addresses,so they are always to hand.

The disk or cassette on which the program comes includes quite a number of sample programs in addition to the main program on it. It runs on the 32K New ROM PET and the 80-column SuperPET. The program consists of a machine code routine that sits at the top of memory using up about 3K of RAM. It should be compatible with all disk and cassette units. To appreciate what PRO–KIT can do, it is worth looking at each of the main features in turn.

Date routine: When SYS29699 is called, this routine accepts a valid date and stores it in the variable Q$, formatted with spaces. It will not allow an illegal date to be entered. This can save quite a few lines of BASIC code in your own programs.

General inputs: A cunning routine that allows you to specify the maximum length of an input string and what input to accept. The variable VC$ is used as follows:

VC$="ABCDEFG"

This only allows the characters A–G to be entered, all other key presses being ignored. In practice this is quite useful where an unskilled PET user can be prevented from pressing the wrong keys. The maximum length of the input is stored in location 1, so POKE1,30 will only allow input of up to 30 characters. If VC$="0123456789" the input becomes an integer-only input and no fractions are accepted.

The numeric input routine handles the input and formating of numbers. We found it performed well but you have to POKE some locations in order to use it.

A welcome facility is the graphics conversion routine which allows text to be printed on the CBM printer without graphics appearing in place of upper case characters.

There is also a search routine that enables the use of an Instring$ function on the PET. This will search for a specific substring in a string. The string storage variable can be up to 255 characters long. Next the string to be searched is assigned to S2$ and the substring to S1$. You execute SYS29708. Location 32767 will then contain a number (N) which tells you that the substring has been found to begin at the Nth position in the string. PEEK(32767)=0 would indicate that no match had been found.

Other features include a screen exchange routine, the ability to store up to 10 screens or sets of graphics for animation and instant text printing.

It was pleasing to discover that the program also allows itself to be saved with your BASIC program so there is no need to keep reloading it. This saves you crashing your PET by forgetting to load PRO–KIT and SYSing to a non-existant program. At first sight it is a complicated program but in practice it will save users a great deal of work. The documentation as we have noted is very well written. The example programs supplied with PRO–KIT#1 should prove useful as teaching aids in the use of the PET.

£40.25 is a lot to pay for 3K of machine code, but it should quickly repay itself in time saved on program development. We would recommend it for the business user but not for the hobbyist, who would be unlikely to be able to make full use of all its functions.

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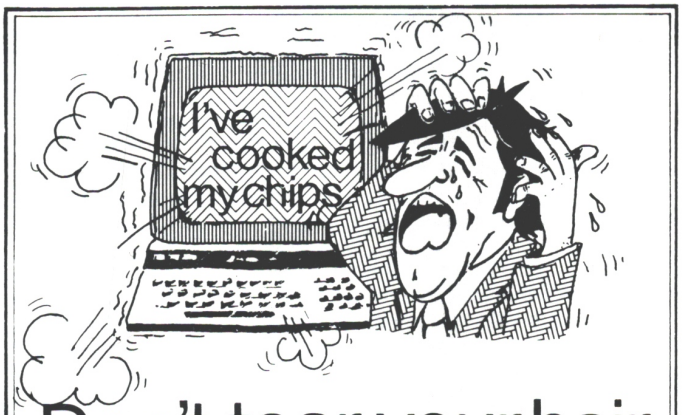

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The Programmer's Friend

PROGRAM NAME: The Programmer's Friend
AVAILABLE FROM: ACT Microsoft, 5/6 Vicarage Road, Edgbaston, Birmingham B15 3ES
PRICE: £25.00
REVIEWER: Mark Valentine

ACT Microsoft's software version of the now very popular TOOLKIT chip has finally arrived. This of course means that those with the left hand ROM slot already spoken for (e.g. CompuThink users), can now benefit from the additional commands.

The 12 new BASIC commands which may be used are:

AUTO Automatically provides line numbers when keying in a program.
BREAK Sets a breakpoint in a program
DELETE Removes a block of lines from the program
DUMP Prints the current values of all simple variables.
FIND Lists all the lines containing a given search key.
HELP After a BASIC error, lists the faulty line with the position of the error marked in reverse video.
MERGE Merges two BASIC programs from disk (CompuThink or Commodore).
OFF Turns off the STEP and TRACE facilities.
RENUM Renumbers a program.
STEP Executes a program one line at a time.
TRACE Prints the line numbers of each line executed.
UNBRK Removes a breakpoint.

This powerful programming aid occupies the top 2.5K of memory or so and is activated by SYS 29000. It also provides a repeat key function that will repeat any key held down for more than half a second or so.

We found every single one of the FRIEND's extra commands useful when writing programs. It reduced program writing time and made de-bugging quicker and easier. The MERGE command, for instance, allows the user to merge pre-written subroutines from disk, and saves time having to write the same subroutine into different programs. This way the user can build up his own subroutine library on disk for immediate retrieval at any later date.

FRIEND, however, will work with "new" ROMs. Versions for the new 4000 and 8000 series PETs should be available "any time". On the 3000 series, the FRIEND will coreside with DOS SUPPORT 4.0 if they are loaded in the following manner:

```
LOAD "DOS SUPPORT 4.0",8
LOAD "FRIEND",8
SYS 2222
SYS 29000
```

This means that not only do you have the 12 extra BASIC commands of FRIEND but you also have the additional commands of DOS.

For CompuThink users, care has to be taken not to use the $HALT command whilst the FRIEND is operative.

We detected a minor bug in the FIND command. (ACT say they will sort this out). If the operator tries to FIND anything within quotes:

e.g. FIND "TEXT",1200–1450

the PET will respond with "SYNTAX ERROR". It can be overcome provided that a line number range is not specified:

e.g. FIND "TEXT

The absence of the 'close quote' overcomes this problem but searches the whole of memory.

The RENUMBER command is more powerful than that implemented on the TOOLKIT, allowing *parts* of a program to be renumbered.

The PROGRAMMER'S FRIEND represents excellent value for money and is an invaluable aid to the programmer. We would rate it as good as, if not better than TOOLKIT. The ROM slot, freed by FRIEND, can now be used by other devices without losing the many facilities provided by that extremely useful chip.

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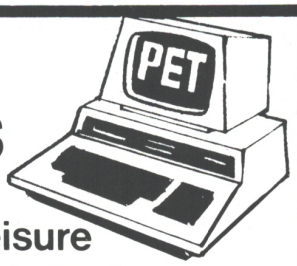

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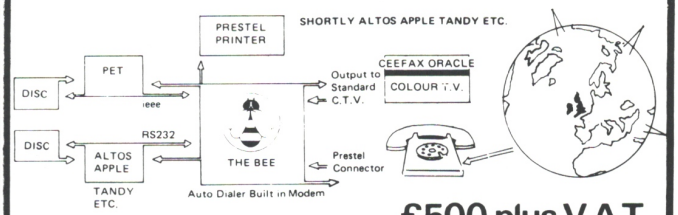

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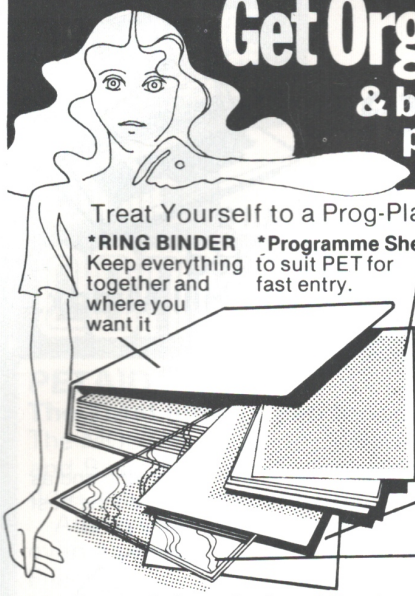

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The +20 Chip

PRODUCT: The +20 Chip
SUPPLIER: Currie & Maughan, 204 Durham Road, Gateshead, Tyne & Wear NE8 4JR
PRICE: £60 + VAT
REVIEWER: Tommy Turnbull

Yes, the +20 *is* another plug-in chip for the 40 column PET but it is one that offers some different facilities to other chips currently on the market. It is a 4K EPROM that plugs into the $9000-to-$9FFF socket in the PET, although the makers will customise to other locations on request. It co-exists quite happily with the Toolkit — indeed, the SYS routine which initializes the chip checks to see if the Toolkit is present, and if it is, initializes it at the same time.

The chip was designed by a business software consultant who developed many of the routines to speed up BASIC subroutines which were too slow or unwieldy for business use. There is also a two-level security system built in. It offers 22 extra commands, which are mnemonic and are always preceded by a '!'. They fall into five main categories. It comes with a ten page instruction book that describes how to fit the chip and what each new command does. They have sensibly supplied a specimen line of program and some indication of the limitations.

The chip is Commodore oriented and is designed to work with the Commodore disk unit and printer. It is not compatible with CompuThink disk units, although most of the commands would be unaffected by the use of a different printer.

The first group are operating commands for the disk unit and are available immediately the chip is initialized. This is very helpful and their usefulness is further enhanced by the fact that they are also programmable. They are:

!DIN	or 1 disk initialize
!DIR	or 1 disk directory
!DLO	disk program load
!DLR	disk program load and run
!DSW	disk sequential file open to write
!DSR	disk sequential file open to read

Next come the special routines which are so much faster than their BASIC equivalents and, of course, take up no space in the PET's memory.

!FMT is probably one of the best commands on the chip. It gives high speed numeric formatting for both the screen and the printer. The command is followed by the format specification, say 3.2; that is, 3 places before the decimal point and 2 after. This is followed by the array name, which might be X(I). The routine adds trailing zeros and has one leading zero. Overflows are indicated by '*'s printed to the correct format. This is illustrated in the example below:

X(I)	!FMT3.2X(I)
0	0.00
-1	-1.00
25.12645	25.13
6.87245E—03	0.01
75892.123	***.**

Its range is a total of 14 numeric characters with a maximum of either 9 before or 9 after, which should cover most eventualities. Using 4.0 will give an integer printout to the nearest whole number, not rounded down. The instruction book reveals one snag, however; it sometimes generates an oddly formatted zero printout. The manual offers a means of overcoming this. For me this is the best command on the chip and to the best of my knowledge,unique.

The next most useful command is probably !SCI for screen input; this gives the PET a line input facility which it would otherwise lack. The command is followed by the co-ordinates of the position of the first character to be inputted and the number of characters to be entered. These characters are read from the screen and replaced by blanks so that the user can see if any characters have been missed. Delimiters such as ',' , ';' and ' " ' can be inputted without difficulty. The characters which have been read are converted to a string variable SI$ that's available to a BASIC program. The principal use for this command will be where screen amendments to data are required. This can be carried out simply by overwriting and then scanning the screen.

!SPR is the screen print command. It transfers the exact contents of the screen to a Commodore printer at high speed. This includes graphics, reverse field characters plus an exact copy of anything within quotes, with commands and the quotes themselves. The command has two extra bonuses; firstly, it is followed by either a T or a G denoting whether text or graphic spacing is required. The T or G are followed by a 0 or a 1 indicating normal or enhanced print size.

!SRT followed by a string array name generates an alphabetic sort of that array, and can be easily adapted to perform numeric sorts; the instructions tell you how.

!DLY followed by a number between 01 and 99 allows a delay of that number of seconds before the program continues, which is handy because it doesn't use up a for/next loop.

The next eight commands are common to most of the present generation of superchips. They switch on and switch off the repeat facility for each key, enable and disable the stop key, scroll the screen up or down, control screen reverse, and reverse and restore the screen a specified number of times.

The last three commands are programming aids and would be used virtually as additions to the Toolkit.

!TPR was a new one on me. It allows print statements (to the Commodore printer) which contain upper and lower case, to be typed as they would be for a screen output, that is to say, using the shift key. The routine automatically inserts the appropriate control characters.

!IPT permits the use of the ← character as shorthand for the INPUT command. Once the program is finished !IPT converts every ←to 'input'.

Lastly !DPM followed by the drive number and file name, allows a program saved in the form of a sequential file to be merged with a program in RAM. This is something I find quite useful. However, the booklet contains a warning that it could lead to an upset BAM, the symptoms of which are some unwanted merges between other programs. The booklet suggests that this can be overcome by immediately saving the merged program and then switching everything off. My advice would be to treat this facility with some caution.

The two-level password routine consists of two randomly generated four-character codes, one of which only works with one routine, whilst the other operates both, so giving two levels of security.

Conclusion: With so many 'superchips' now available it isn't always easy to choose. However, this 4K chip provides some really useful additions to the armoury of PET utilities. Combine it with the Toolkit and you have covered most of the facilities the business programmer will regularly need.

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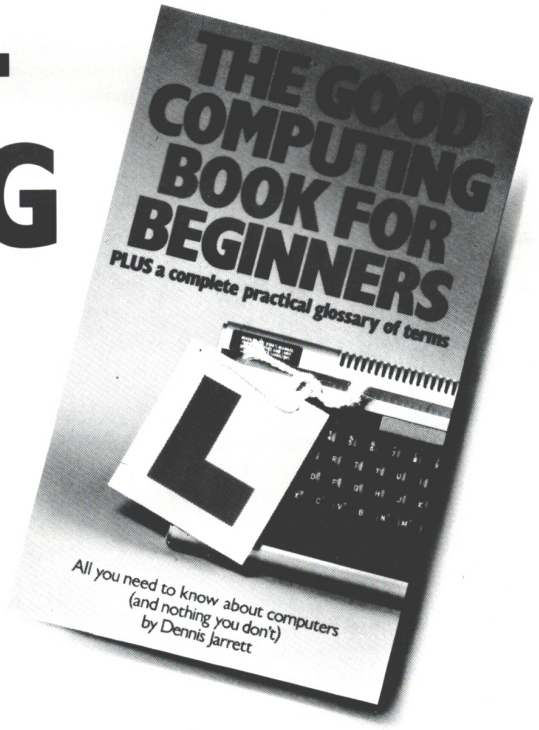
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REVIEWER: John Nuttall

Another file management system hits the market! It's beginning to look rather like another STOCK CONTROL situation with a proliferation of packages. This particular program is especially suitable for accounting, stock control, payroll or information retrieval and as such is similar to PETAID, COMPSOFT and OZZ. All these programs are termed data base systems which my computer dictionary describes thus:
".....a file of data so structured that appropriate applications draw from that file and update it, but do not themselves constrain a file design or its content.....a file which is not designed to satisfy a specific limited application."

This package is rather different for a variety of reasons. Firstly, the disk is totally uncopyable. My normal practice is to make a security copy before doing a review, but in this case some rather clever programming makes this difficult, if not impossible. So, a back-up copy of the program is provided on the flip side of the disk. The program disk resides in drive 1 and the file disk in drive 0 and that feature gets low marks from me because it breaks an (unwritten) convention.

INFODISK uses an index access method of storing records. It is very simple to design records according to your needs. Records may have a maximum of 2400 characters and up to 150 fields, each field may contain up to 80 characters. Having said that, the maximum number of records held per disk is 600, providing records are less than one block. Note too, that the maximum record size is ten blocks. That's flexible enough for most users, but we suspect stock control programs would need more than this. The key field must be unique as it is used to identify the record for recall, but it may be alphanumeric or any of the available data types.

Before creating a file you will need to specify field names and data types. This latter feature is rather distinctive and will help prevent input of bad data. INFODISK lets you change these characteristics at a later date should you need to, without having to rewrite the whole file. The data types available are:

0 used for calculable quantities
1 alphabetic only A–Z
2 numeric only 0–9
3 combines 1 and 2: alphanumeric
4 combines 1 with "–", "' " and "&"
5 type 2 with "–" and "+"
6 type 5 with decimal point
7 all characters
8 date format (also permits date comparison)

All input statements are crash-protected and will reject invalid data. I'm not a trained typist but I did find that this data checking takes time, and the screen was somewhat behind my fingers, if you get my meaning!

Poor Documentation

The manual is adequate but there is also a digest of it on disk as INFORMATION 1 and INFORMATION 2. These are rather dreadful in presentation; everything is in upper case with no spacing and words wrapped round to the next line. There's no excuse for that and it creates a bad impression. But having said that, I liked this program. I liked the ability to do calculations with near-ordinary language: a field defined as 0 may contain an expression such as STOCK VALUE = COST PRICE * QUANTITY IN STOCK. Expressions may be as complex or deep as you like, and pressing RETURN will put the calculated value in that slot. The program is menu driven so you won't have the frustration of loading up separate bits to do each job. Standard routines are included to insert, delete or amend a record. Sorting is available in ascending or descending order and the sorted file is sent to disk.

You can also LIFT if..... followed by a condition, which pulls the record out if it meets the criteria. I had some trouble with this one, until I found that there should be no space between *if* and the field desired. So we can have something like the following for a simple stock control program I designed:

LIST ifdescription="brush" and number held =10

On more than one occasion the screen put up a prompt which wasn't covered by the manual. And why press the space bar twice after LISTing?

The PRINT facility works rather like LIST except that it produces hard copy. This routine didn't work well on my Anadex printer. Don't bother looking at the listing because you can't get inside. When eventually I did manage to break the program (illegal quantity error in 3053) I asked it to be listed, but only managed a reset of the PET. A second shot was a bit more subtle: OPEN 4,4:CMD 4: LIST..... but still the same result! So, one penalty you pay for security is that you can't make any changes to routines.

Finally, let me just mention another utility on the disk. It's a program called CALINFODISK which is a batch processing program designed to work on files created with INFODISK. It can be used as an "update" routine to work on the whole file or part of it. This is most useful and will save considerable time and typing. Imagine that you want to increase all your prices by ten per cent..... or the VAT rate changes. This program will maintain your files in a flash.

Conclusion: INFODISK certainly satisfies the criteria for a data base with some powerful search facilities and the ability to produce linear or tabular reports. There are some frustrating elements in it, which demonstrate that the perfect package is seldom perfect for everyone. We think that if you have a need in this area, you should contact your dealer and arrange a demo to see for yourself whether INFODISK will answer those needs. We think that if your needs do fall into this category, you should definitely look at INFODISK; most dealers will be happy to arrange a demonstration.

Commodore PET Users Club

The PET Users Club was founded in order to provide news, ideas, applications and programs relating to the PET and to act as an information exchange between Commodore and PET users and amongst PET users themselves. Approximately 8 times a year we send out the Commodore PET Users Club Newsletter to all our members. This contains product news, hints and tips on programming and details of PET compatible hardware and software available from other manufacturers.

Many of our program authors are members and use the programming hints published in the Users Club Newsletter to "tune" their programs to provide maximum performance. For first time PET Users, reading the newsletter is one of the best ways of mastering the powerful capabilities of the PET. Other members are users of PETs owned by companies, Schools and Colleges. Quite a few people "just thinking" about buying a PET join too.

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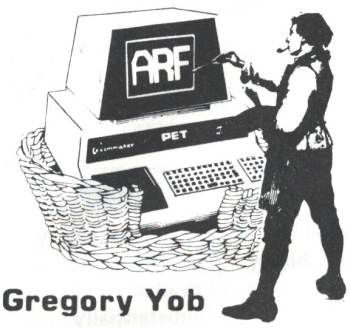

by Gregory Yob

```
PROGRAM 1 - PRINTER LIST

 63000  DEFFNF(X)=PEEK(X)+256*PEEK(X+1):P=1025:T$=CHR$(126):DATA\__\
 63010  READN$:IFN$<>"\__\"THEN63010
 63020  P$=CHR$(115)+CHR$(112):DIMS$(75),C%(9),C$(9):FORJ=0TO75:READS$(J):NEXT
 63030  Q$=CHR$(112)+CHR$(105):R$=CHR$(13):S$="sp ":FORJ=0TO9:READC%(J),N$
 63040  FORK=1TOLEN(N$):C$(J)=C$(J)+CHR$(ASC(MID$(N$,K))+32):NEXTK,J
 63050  DATAEND,FOR,NEXT,DATA,INPUT#,INPUT,DIM,READ,LET,GOTO,RUN,IF,RESTORE,GOSU
B
 63060  DATARETURN,REM,STOP,ON,WAIT,LOAD,SAVE,VERIFY,DEF,POKE,PRINT#,PRINT,CONT
 63070  DATALIST,CLR,CMD,SYS,OPEN,CLOSE,GET,NEW,TAB(,TO,FN,SPC(,THEN,NOT,STEP,+,
-
 63080  DATA*,/,↑,AND,OR,>,=,<,SGN,INT,ABS,USR,FRE,POS,SQR,RND,LOG,EXP,COS,SIN,T
AN
 63090  DATAATN,PEEK,LEN,STR$,VAL,ASC,CHR$,LEFT$,RIGHT$,MID$,GO
 63100  DATA147,CLR,19,HM,145,UP,17,DN,29,RT,157,LFT,148,INS,20,DEL,18,RVS,146,0
FF
 63110  INPUT"clr PGMsp NAME:";N$:OPEN 4,4:PRINT#4,CHR$(30)R$R$R$R$N$R$
 63120  N=FNF(P+2):T=P+4:P=FNF(P):IFN=63280THENEND
 63130  PRINT#4,N"sp ";:Q=0:GOSUB63140:PRINT#4:GOTO63120
 63140  C=PEEK(T):IFC=0THENRETURN
 63150  GOSUB63160:GOTO63140
 63160  T=T+1:IFC=34THENQ=Q+1AND1
 63170  IFQTHEN63220
 63180  IFC=255THEN63230
 63190  IFC>203THENC=42
 63200  IFC<128THENPRINT#4,CHR$(C);:RETURN
 63210  PRINT#4,S$(C-128);:RETURN
 63220  IFC=32THENPRINT#4,P$S$;:RETURN
 63230  IFC=255THENPRINT#4,Q$S$;:RETURN
 63240  IFC>31ANDC<128THENPRINT#4,CHR$(C);:RETURN
 63250  IFC>159THENPRINT#4,T$;CHR$(C);:RETURN
 63260  FORJ=0TO9:IFC=C%(J)THENPRINT#4,C$(J)S$;:RETURN
 63270  NEXT:RETURN
```

NOTE THAT LINES 63050, 63070, 63080 AND 63100 WILL FIT ON YOUR PET, PROVIDED THAT YOU DON'T ENTER ANY SPACES.

A List Program For Non-PET Printers

A long time ago, as time is seen in small computers, I took a look at how the Basic was stored in the PET, and came up with a program which listed itself. *(PRINTOUT Dec. 80)*. In the last several columns an undesirable number of typos have crept in, probably because I am too lazy to re-enter a program to see if it works. To combat this, I will now use genuine listings (via my listing program) for any programs longer than a few lines.

Program 1 shows my listing program as set to list itself. This program should work with almost any full ASCII printer, and with minor changes, on any printer that can print the letters and numbers, such as a Teletype (TM). Operation of the program is simple. First, LOAD the program you want to list. Then, using the Programmer's Toolkit APPEND (or Disk-O-Pro's MERGE), append the PRINTER LIST program. When your printer is ready, a RUN 63000 will do the job. The screen will clear and ask for:

PGM NAME:?

which lets you enter a little line of some kind. The printer will then list the program, NOT including the Printer List portion.

PRINTER LIST is written to save as much space as possible (Some of you out there will find ways to save a few bytes, I am sure.) and as a result will look a bit obscure. Let's take a short walk through the program to shed some light on this. If you don't know how Basic is put together, I refer you to the Dec. 80 column mentioned earlier.

FNF in Line 63000 computes the value of a pointer at X. That is, if addresses X and X+1 are a pointer, FNF figures out the pointer's value. P is set up to the first pointer in a Basic program which is usually at 1025. (Some creative types will change the Bottom-of-Basic pointer to pick up the 191 bytes in the Second Cassette Buffer. Be duly warned.) T$ is set to the tilde (~) character in ASCII.

The unusual string in the DATA statement,\← ←\, was chosen to be a string which is not likely to appear in any program. Line 63010 reads any DATA lines in the program to be listed and will stop with the DATA pointer just past this unusual string. This is a cheap way to do the equivalent of RESTORE 63010 which is not available on the PET.

The string P$ is set to the ASCII Lower Case letters "sp", Q$ is set to "pi". There is no direct way to set these characters in the PET, as the values 96 to 127 are not enterable via the keyboard. In Line 63020, the string array S$ is defined and loaded with the 75 Basic token names END ... GO. These names are in the DATA statements in Lines 63050-63090. (Note: The "new" PET ROMs have the GO token added at the end of the tokens table. This will not influence listings done on "old" ROM PETs.) To save space, the strings R$ and S$ are set to the Return and Space characters, respectively. Note that on the listing, S$="sp" really means: S$=" ". The why of this will be explained later.

After the tokens are in place, the ten special characters (cursor movements and the like) are read into the arrays C% and C$. The elaborate calculation in Line 63040 converts the upper case letters in N$ to their ASCII lower case values and sticks the result into C$. The result of this is the value in PET ASCII of a special character is found in C%() and its listing name in C$().

The program proper (ie, after all this setting up) starts in Line 63110 where a little line is asked for under PGM NAME:. The OPEN then accesses the printer (my printer is IEEE device #4. If your printer is not on the IEEE bus, you will have to replace all of the PRINT#4 statements with a GOSUB to your printing routine.) We then print to the printer some carriage returns, the title line, and one more carriage return. Note that routine takes advantage of the PET's permissiveness on missing semicolons in PRINT statements. The CHR$(30) is a peculiarity of my Comprint printer, which wants to see this character to leave its automatic pagination mode. (My printerbeast will do pagination at very inappropriate times unless I explicity turn it off.) You can send any initialization for your printer, such as a form-feed, at this place.

Line 63120 computes the line number N from the line number stored after the Basic link pointer, and sets T to point at the first byte of the program line's text. P is then updated to look at the next line of program, and a test is applied to N.

VERY IMPORTANT! When you first use this program, change the end of Line 63120 to read: IF N=63000 THEN END . To list this program on my printer, I placed a REM at 63280 and changed Line 63120 to what you see here. 63000 is the first line in PRINTER LIST, and when it is seen, this test prevents the PRINTER LIST code from being listed.

Line 63130 prints the line number, N, and a space (here seen as "sp"). We then initialize Q, which is a flag for quote mode, and call Subroutine 63140 whose job is to actually list the contents of a line. Then a forced carriage-return via the PRINT#4 and on the next line via the GOTO.

At 63140, C is set to the current byte being scanned. A value of zero indicates the line is finished, so return. The job of Subroutine 63160 is to decide what to do with C. First, bump the pointer T up one, and then check C for quotation marks. (Quotes are CHR$(34).)

The expression Q=Q+1AND1 is an even/odd counter for the number of quotes found, with 0 for out-of-quotes mode and 1 for in-quote mode. At 63170 we decide if quotes are fashionable, and if so, skip to 63220.

Lines 63180-63210 handle non-quotes listing. First, the pi (π) token is checked for, and the sequence Q$$$ will print "pi"

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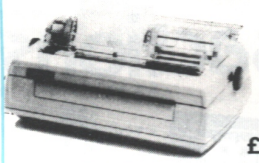

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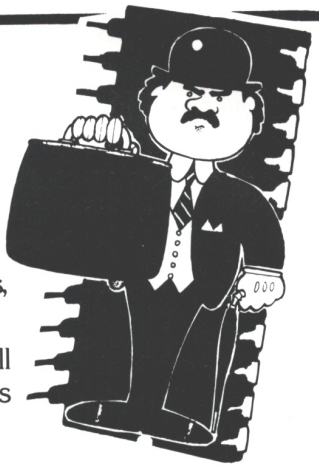

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to the printer in Line 63230. Tokens larger than 203 (the largest token in non Basic 4 PETs) will force an asterisk as an indication that what is being listed is probably not a Basic program. In 63200, values below 128 are printed as they appear—things like TI$, for example. In 63210, we print the token's name by fetching the correct name from S$. (You can't scramble the tokens order in S$!)

Starting at 63220, we handle the in-quotes mode, which covers the string assignments, DATA and PRINT string literals. First we check for Space and Pi, and print these if found as "sp" or "pi". Values between 32 and 127 are printed as usual, as seen in Line 63240. If C exceeds 159, we know it to be a graphics character, and it is printed as the sequence (tilde) (PET Lower Case Equivalent). For example, the diamond (shift-Z) comes out as "~Z". The tilde warns of a shifted character.

All that's left to do are the special characters, checked for in Line 63260. Line 63270 provides a graceful exit if the special character isn't recognized.

One difference from my usual ways of typing a program is that the tilde will indicate a shifted character instead of an underline. As my typewriter does not have a tilde, I will still underline any short bits of program in the text of this column.

If you want to use some other representation of the PET's special characters, the change is easily made. Simply change the names in Line 63100, for example,

```
63100 DATA 147,CLEAR,19,HOME, .... (etc)
```

In line 63260, surround the CS() with some brackets, ie,

```
63260 FORJ=ØTO9:IFC=C%(J)THENPRINT#4,
      "["C$(J)"]";:RETURN
```

We will now see cursor movements as (CLEAR), (HOME) and so on.

As a challenge, do a "look-ahead" in PROGRAM LIST which 1) counts the number of repeated characters for cursor movements and spaces only—so we see something like:

6-right 5-space

appearing in the listing. When spaces are counted, if they appear between letters, like "HELLO OUT THERE" the listing gives us:

"HELLO OUT 2-space THERE"

I am sure this will keep you busy for an evening. Send me the results, I can use it!

Hangmath Returns

In a recent 1980 column I described a program, *Hangmath*, and some improvements to make the program more playable and enjoyable. The job wasn't complete, however, and Paul Agosta sent me an improved version which provides a report of past guesses and (I'm impressed!) draws the gallows, etc. on the right side of the screen. Program 2 shows the improved version of *Hangmath* for your enjoyment. (And as an exercise in reading the output of PRINTER LIST.)

Do try it out—the improvements are worth seeing. Deliberately lose a game to see the animation—simple, and effective.

```
HANGMATH AS IMPROVED BY PAUL AGOSTA

 10  REM ** SEE TITLE PAGE FOR CREDITS **
 20  REM **   USE ONLY  NOT FOR SALE   **
 40  CLR:GOSUB2000
 50  XX$="up sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp sp s
p sp sp sp sp sp sp sp sp sp sp sp sp sp sp "
 60  S$="hm dn dn dn dn dn dn dn dn dn dn "
 70  DIM A(4,5),B(4,5),C(4,5),E$(4,5),HM$(12),P$(13)
 72  FORJ=1TO12:READHM$(J):NEXT
 73  DATA "HEAD","UPPERsp BODY","LOWERsp BODY","LEFTsp ARM","RIGHTsp ARM","LEFTs
p LEG"
 74  DATA "RIGHTsp LEG","LEFTsp HAND","RIGHTsp HAND","LEFTsp FOOT","RIGHTsp FOOT
"
 75  DATA "sp sp sp sp sp sp sp sp*****sp YOU'REsp HUNG!!sp *****"
 76  P$(Ø)="lft lft lft lft lft lft lft lft lft lft lft lft lft rvs ~@~@~@~1~@~@~@~@
~@~@~@~@lft lft lft lft lft lft lft lft lft lft lft lft lft dn sp sp HANGMATHsp sp l
ft lft lft lft lft lft lft lft lft up "
 77  P$(Ø)=P$(Ø)+"up ~]up lft ~]up lft ~]up lft ~]up lft ~]up lft ~]up
lft ~]up lft ~Ø~@~@~@~@~.off dn lft ~]"
 78  P$(1)="lft lft lft lft up up up up up up up ~W"
 79  P$(2)="lft lft lft lft up up up up up up ~["
 80  P$(3)="lft lft lft lft lft up up up up up ~1"
 81  P$(4)="lft lft lft lft lft lft up up up up up up ~-"
 82  P$(5)="lft lft lft up up up up up up ~="
 83  P$(6)="lft lft lft lft lft lft lft up up up up up ~U"
 84  P$(7)="lft lft lft lft up up up up up ~I"
 85  P$(8)="lft lft lft lft lft lft up up up up up up up ~;"
 86  P$(9)="lft lft lft up up up up up up up ~,"
 87  P$(10)="lft lft lft lft lft lft up up up up ~>"
 88  P$(11)="lft lft lft up up up up ~<"
 89  P$(12)="lft lft lft lft lft lft up up up up up up ~,~]~;dn lft lft lft ~-~[~=dn
lft lft lft ~U~1~Idn lft lft lft ~<sp ~>dn dn dn rt rt "
 90  P$(13)="lft lft lft lft lft lft up up up up up up up sp rt sp dn lft lft lft sp
~]sp dn lft lft lft sp sp sp dn lft lft lft sp sp sp dn lft lft lft sp sp sp dn
dn dn rt rt ":POKE59468,12
 91  PRINT"clr sp SETTINGsp UPsp ...."
 92  FORB=ØTO10:K(B)=-1:Q$(B)="":CK$(B)="":NEXT
 94  PRINTS$;"dn dn dn dn dn dn "
100  W=Ø:F$="":R1=RND(-TI)
110  C$="ABCDEFGHIJ"
120  R=INT(LEN(C$)*RND(1)+1)
125  N$=MID$(C$,R,1):F$=F$+N$
130  IFR>1THENT$=LEFT$(C$,R-1):GOTO150
140  T$=""
150  C$=T$+MID$(C$,R+1)
160  IFLEN(C$)>ØTHEN120
170  IFLEN(F$)<>10THEN100
210  N(Ø)=100+INT(RND(1)*900)
220  N(1)=10+INT(RND(1)*90)
230  N(2)=N(Ø)*(N(1)-10*INT(N(1)/10))
240  N(3)=N(Ø)*INT(N(1)/10)
250  N(4)=N(Ø)*N(1)
255  IF10*INT(N(1)/10)=N(1)THEN220
260  FORX=ØTO4:C=Ø:FORY=1TO5
270  A(X,Y)=INT(N(X)/INT(10↑(5-Y)))
272  B(X,Y)=A(X,Y-1)
274  C(X,Y)=A(X,Y)-10*B(X,Y):E$(X,Y)=MID$(F$,C(X,Y)+1,1):C=C+C(X,Y)
280  IFC=ØTHENE$(X,Y)=""
290  NEXT:L(X)=LEN(STR$(N(X))):NEXT
400  PRINT"hm HANGMATHsp sp sp sp sp sp sp dn *up lft ";
402  FORX=ØTO4:FORY=1TO5:T=20
404  IFX=3THENT=18
410  PRINTTAB(T-L(X));E$(X,Y);"sp ";
420  NEXT:IFX=1ORX=3THENPRINT:PRINTTAB(13);"~@~@~@~@~@~@~@~@~@~@up "
430  PRINT:NEXT:PRINT
440  IFW=ØTHENGOSUB5000
500  T=1:GOSUB3200:IFFTHENPRINT"lft rvs QUIT":W=12:GOSUB5000:GOTO1000
501  FORJ=ØTO10:IFZ$=CK$(J)THENM$=Z$+"sp ="+STR$(J)+",sp BOZO":GOSUB3500:GOTO50
0
503  NEXT:IFN=K(N)THENM$=MID$(F$,N+1,1)+"sp ="+STR$(N)+",sp DUMBO":GOSUB3500:GO
TO500
```

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STOP PRESS: LATE NEWS ON VIC from Jim Butterfield.

— 3K RAM plugs in on the memory expansion port. It seems as if games will come complete with the extra RAM they might need.

— Didn't spot the character matrix in my previous wanderings. It's not referred to by the Basic program, and my fundamental tool is a disassembler. However, while reading a Japanese treatise on build-your-own characters, I decided that it had to be somewhere.....and $8000 was it. Whenever VICs start shipping, you can have fun using the tables there to build giant-size graphic characters.

— Thought I should mention the pound sign.

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FURTHER INFORMATION ON 01-960-5899.

Peeks & Pokes

by Inside Trader

Bad news for Kit. Despite the successful conclusion of phase two of the Spencer masterplan for the take over of Commodore Europe, Tramiel now tells me he is planning to put a continental supremo in over Kit's head. "The boy's far too nice to run Europe," drawls the 'Chief Executive Officer'.

First applicant for the post of staffwriter advertised in the last issue was Computnig Toady's thespian Editor, 'Enery Budgett, closely followed by Gavin Sanders' two nephews, Rodney and Charles, who cited their experiences as debs delights and operators of Sebastian Teddy's mobile disco. "Over my dead body" muttered the Editor. "That can be arranged" came the reply.

Apple brass are laughing themselves silly over the impending Commodore vs. Peddle lawsuit. Apple considered suing when Peddle skipped merrily back to Commodore with all their secrets after only a few weeks employment, but decided not to on the grounds that it was unwise to wash dirty linen in public.

I recall the occasion in happier times when the Commodore arranged for Peddle to address a high powered meeting of Wall Street Analysts. The PET's inventor, after herculean efforts, arrived at New York's swish '21' Club, clad in the necessary suit and tie. Only his shoes were missing, and the Commodore had to make a hurried trip to 5th Avenue for replacements. A glance at the latest accounts shows that true to form, they are still being depreciated.

Personal Computer World's Desperate Dave Tebbutt has had to weather a barrage of ridicule after reporting the existence of a program called 'The Last One'. The gist of his story was that the program could generate other programs, and was thus the last one that humans need ever write. Unfortunately, David is a little hard of hearing and the whole misunderstanding arose when my friend David James, a celebrated practical joker, told D.D. that he was pulling 'a fast one'.

Commodore's bearded 'special' projects manager and intellectual in residence, Nick Green, whose qualifications for the position include a third in Marine Biology, is a man of arcane interests. Latest project to be taken under the Green wing is a program that purports to disassemble the human brain. Unkind wags in his office are saying they know who the guinea pig was.

Hampshire police are anxious to make the acquaintance of a mysterious Citizens Band radio enthusiast who broadcasts under the pseudonym 'Skywalker'. Such are the power of Skywalker's illegal emissions, that he is credited with the single-handed destruction of two mainframe computers, eleven model aircraft and an iron lung. *PRINTOUT* staff have been admiring the addition of an unusual looking aerial to the Gavin Sandersomobile.

Commodore will shortly be announcing a 'new' PET language, CSL, short for Commodore Systems Language. In order to avoid involving the company in a nasty copyright suit, readers will naturally wish to restrain their immediate instinct to exclaim "Gosh, isn't it like PL65?"

Before we are all carried away on the rising tide of VICmania, allow me to quote verse XXXIV of the official Commodore anthem, sung daily by all employees to the tune of 'Coming Round the Mountain':

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